REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR OZONE ATTAINMENT IN THE INDIANA PORTION OF THE LOUISVILLE BASIC OZONE NONATTAINMENT AREA

Clark and Floyd Counties, Indiana

Developed By:
The Indiana Department of Environmental Management

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TABLE OF CONTENTS

FIGURES

TABLES

GRAPHS

APPENDICES

REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR OZONE ATTAINMENT IN THE 8-HOUR OZONE BASIC NONATTAINMENT AREA

CLARK AND FLOYD COUNTIES, INDIANA

1.0 INTRODUCTION

This document supports Indiana's request that Clark and Floyd Counties, which are part of the Louisville basic ozone nonattainment area, be redesignated from nonattainment to attainment of the 8-hour ozone standard. In addition, the State of Kentucky also intends to submit a request for the Kentucky portion of the Louisville basic ozone nonattainment area to be redesignated from nonattainment to attainment of the 8-hour ozone standard. The Louisville area has recorded three years of complete, quality assured ambient air quality monitoring data for 2003 – 2005 demonstrating attainment with the 8-hour standard.

Section 107 of the Clean Air Act (CAA) establishes specific requirements to be met in order for an area to be considered for redesignation including:

(a) A determination that the area has attained the 8-hour ozone standard.
(b) An approved State Implementation Plan (SIP) for the area under Section 110(k).
(c) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements.
(d) A fully approved maintenance plan under Section 175(A).
(e) A determination that all Section 110 and Part D requirements have been met.

This document addresses each of those requirements. It also provides additional information to support continued compliance with the 8-hour ozone standard.

1.1 Background

The Clean Air Act Amendments of 1990 (CAAA) required areas failing to meet the National Ambient Air Quality Standard (NAAQS) for ozone to develop SIPs to expeditiously attain and maintain the standard. In 1997 the United States Environmental Protection Agency (U.S. EPA) revised the air quality standards for ozone replacing the 1979 1-hour standard with an 8-hour ozone standard set at 0.08 parts per million (ppm). The standard was challenged legally and upheld by the U.S. Supreme Court in February of 2001. The U.S. EPA designated areas under the 8-hour ozone standard on April 15, 2004 as attainment, nonattainment, or unclassifiable.

Historically two (2) monitors have been operated by the IDEM's Office of Air Quality in Clark and Floyd Counties. In Clark County, the Charlestown monitor (Airs ID 18-019-0003) has operated continuously since prior to 1980. In Floyd County, the New Albany monitor (Airs ID 18-043-1004) has been operated continuously since 1995. On April 15, 2004, U.S. EPA designated Clark and Floyd Counties Basic nonattainment and subject to the new 8-hour ozone requirements, including development of a plan to reduce volatile organic compound (VOC) and oxides of nitrogen (NO_x) emissions and a demonstration that the area will meet the 8-hour ozone standard for ozone by June 15, 2009.

1.2 Geographical Description

Following is a brief description of the Louisville basic nonattainment area.

Jefferson, Bullitt and Oldham Counties located in north central Kentucky and Clark and Floyd Counties located in southeastern Indiana are part of the Louisville metropolitan statistical area. This area is surrounded by the Kentucky counties of Hardin, Henry, Nelson, Shelby, Spencer, and Trimble and the Indiana counties of Harrison, Jefferson, Scott, and Washington. The Ohio River flows along the border between Kentucky and Indiana and the area lies within the Ohio River Valley. The Louisville Basic Nonattainment Area is shown in Figure 3.1.

The Indiana Department of Environmental Management (IDEM), on behalf of the State of Indiana, is requesting redesignation for Clark and Floyd Counties in Indiana. The Air Pollution Control District of Jefferson County (APCD) is responsible for Jefferson County (Louisville) in north central Kentucky. The Kentucky Department of Environmental Protection (KDEP) is responsible for Bullitt and Oldham Counties in Kentucky. The Kentucky Department of Environmental Protection is requesting redesignation of Kentucky's portion of the nonattainment area, including Bullitt, Oldham and Jefferson Counties, from U.S. EPA Region IV, concurrently.

1.3 Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2003 through 2005, demonstrates that air quality has met the NAAQS for ozone in this Basic nonattainment area. This fact, accompanied by the permanent and enforceable reductions in emission levels discussed in Section 4.0, justifies a redesignation to attainment for the subject area based on Section 107(d) (3) (E) of the CAAA.

2.0 REQUIREMENTS FOR REDESIGNATION

2.1 General

Section 110 and Part D of the CAAA lists the requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. In addition, U.S. EPA has published detailed guidance in a document entitled "*Procedures for Processing Requests to Redesignate Areas to Attainment*", issued September 4, 1992, to Regional Air Directors. This document is hereafter referred to as "Redesignation Guidance". This Request for Redesignation and Maintenance Plan is based on the Redesignation Guidance, supplemented with additional guidance received from staff of the Regulatory Development Section of U.S. EPA Region V.

2.2 Ozone Monitoring

107(d)(3)(E)(i)

1) A demonstration that the NAAQS for ozone, as published in 40 CFR 50.4, have been attained. Ozone monitoring data must show that violations of the ambient standard are no longer occurring.

2) Ambient monitoring data quality assured in accordance with 40 CFR 58.10, recorded in the U.S. EPA Air Quality System (AQS) database, and is available for public view.

3) A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or its affected downwind environs, is below 85 parts per billion (ppb). This showing must rely on three (3) complete, consecutive calendar years of quality assured data.

4) A commitment that, once redesignated, the State will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

2.3 Emission Inventory

107(d)(3)(E)(iii)

1) A comprehensive emission inventory of the precursors of ozone completed for the base year.

2) A projection of the emission inventory for a year at least 10 years following redesignation.

3) A demonstration that the projected level of emissions is sufficient to maintain the ozone standard.

4) A demonstration that improvement in air quality between the year violations occurred and attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology.

5) Provisions for future annual updates of the inventory to enable tracking of the emission levels including an annual emission statement from major sources.

2.4 Modeling Demonstration

While no modeling is required for redesignating ozone nonattainment areas, IDEM has incorporated photochemical modeling information as part of this document to further support its request for Clark and Floyd Counties to be redesignated to attainment.

2.5 Controls and Regulations
107(d)(3)(E)(ii) & 107(d)(3)(E)(v)

1) A U.S. EPA-approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.

2) Evidence that control measures required in past ozone SIP revisions have been fully implemented.

3) Acceptable provisions to provide for new source review.

4) Assurances that existing controls will remain in effect after redesignation, unless the State demonstrates through photochemical modeling that the standard can be maintained without one (1) or more controls.

5) If appropriate, a commitment to adopt a requirement that all transportation plans conform to, and are consistent with, the SIP.

2.6 Corrective Actions for Potential Future Violations of the Standard

1) A commitment to submit a revised plan eight (8) years after redesignation.

2) A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standard occurs.

3) A list of potential contingency measures that would be implemented in such an event.

4) A list of VOC and NO_x sources potentially subject to future controls.

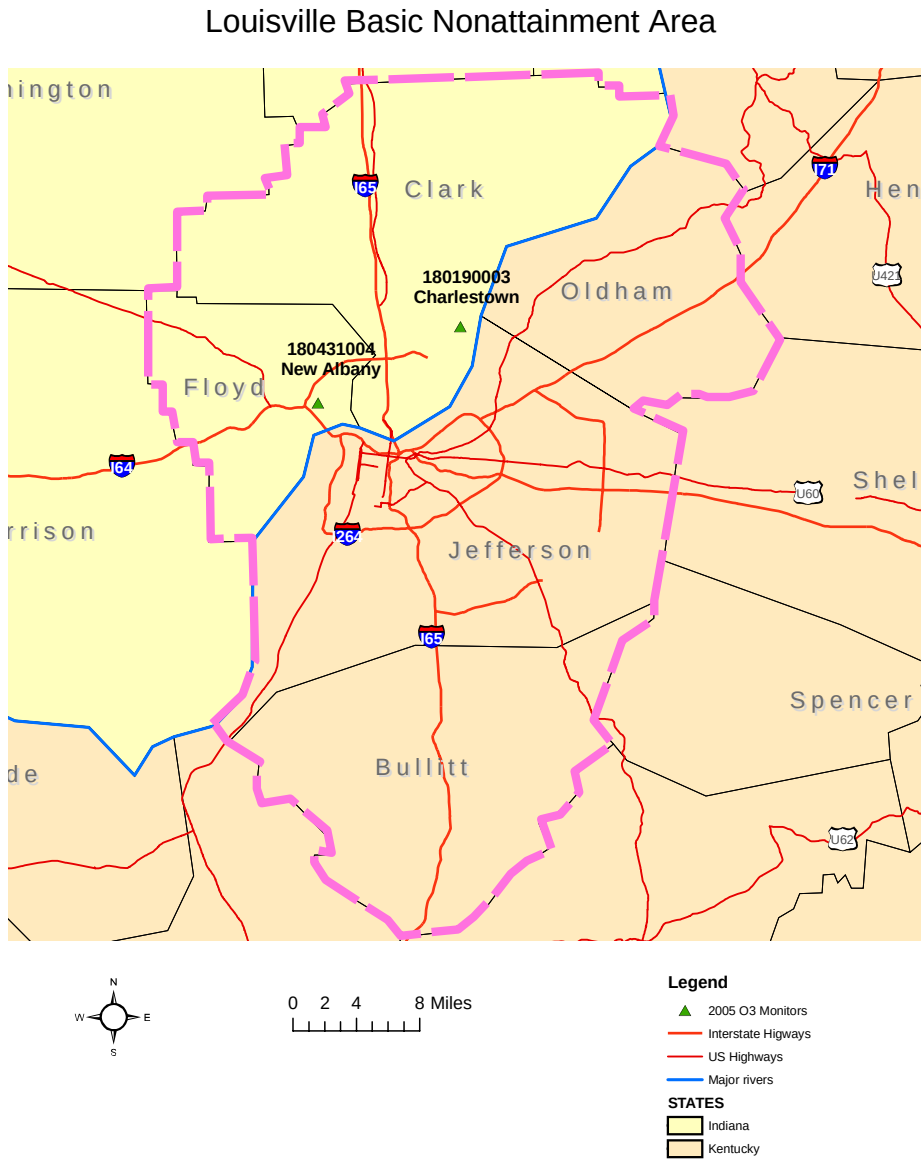
3.0 OZONE MONITORING

3.1 Ozone Monitoring Network

There are two (2) monitors measuring ozone concentrations in Clark and Floyd Counties. These monitors are currently operated by IDEM's Office of Air Quality (OAQ). A listing of the existing monitors' four (4) highest readings from 2003 through 2005 is shown in Table 3.1 and was retrieved from the U.S. EPA's Air Quality System (AQS). The locations of the monitoring

sites for Clark and Floyd Counties are shown on Figure 3.1.

Figure 3.1



3.2 Ambient Ozone Monitoring Data

The following information is taken from U.S. EPA's "Guideline on Data Handling Conventions for the 8-hour Ozone National Ambient Air Quality Standard (NAAQS),"U.S. EPA-454/R-98-017, December 1998.

Three (3) complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the three (3) year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.08 ppm.

When this occurs, the site is said to be in attainment. Three (3) significant digits must be carried in the computations. Because the third decimal digit, in ppm, is rounded, 0.084 ppm is the largest concentration that is less than, or equal to 0.08 ppm. Therefore, for the purposes of this request, the 8-hour standard is considered to be 0.085 ppm. Values below 0.085 ppm meet the standard, values equal to or greater than 0.085 ppm exceed the standard. These data handling procedures are applied on an individual basis at each monitor in the area. An area is in compliance with the 8-hour ozone NAAQS if, and only if, every monitoring site in the area meets the NAAQS. An individual site's three (3) year average of the annual fourth highest daily maximum 8-hour average ozone concentration is also called the site's *design value*. The air quality design value for the area is the highest design value among all monitoring sites in the area.

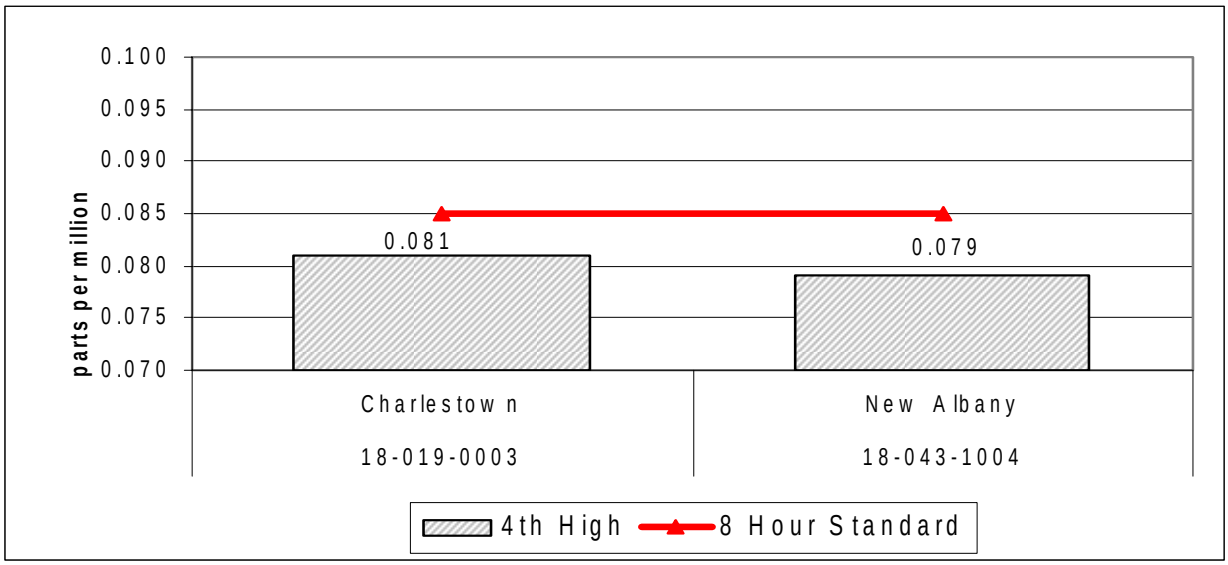
Table 3.1 shows the annual fourth highest values by site and the 2003-2005 design values for both of the ozone monitoring sites in Indiana's portion of the nonattainment area.

Table 3.1 Monitoring Data for Clark and Floyd Counties 2003–2005

					1ST	2ND	3RD	4TH	2003-2005
SITE ID	COUNTY	ADDRESS	YEAR	%OBS	8-HR (ppm)	8-HR (ppm)	8-HR (ppm)	8-HR (ppm)	AVERAGE (ppm)
18-019-0003	CLARK	CHARLESTOWN	2003	99	0.096	0.092	0.092	0.090	
18-019-0003	CLARK	CHARLESTOWN	2004	99	0.08	0.078	0.076	0.074	
18-019-0003	CLARK	CHARLESTOWN	2005	95	0.098	0.092	0.086	0.080	0.081
18-043-1004	FLOYD	NEW ALBANY	2003	100	0.097	0.097	0.092	0.086	
18-043-1004	FLOYD	NEW ALBANY	2004	96	0.079	0.078	0.077	0.071	
18-043-1004	FLOYD	NEW ALBANY	2005	94	0.092	0.086	0.081	0.080	0.079

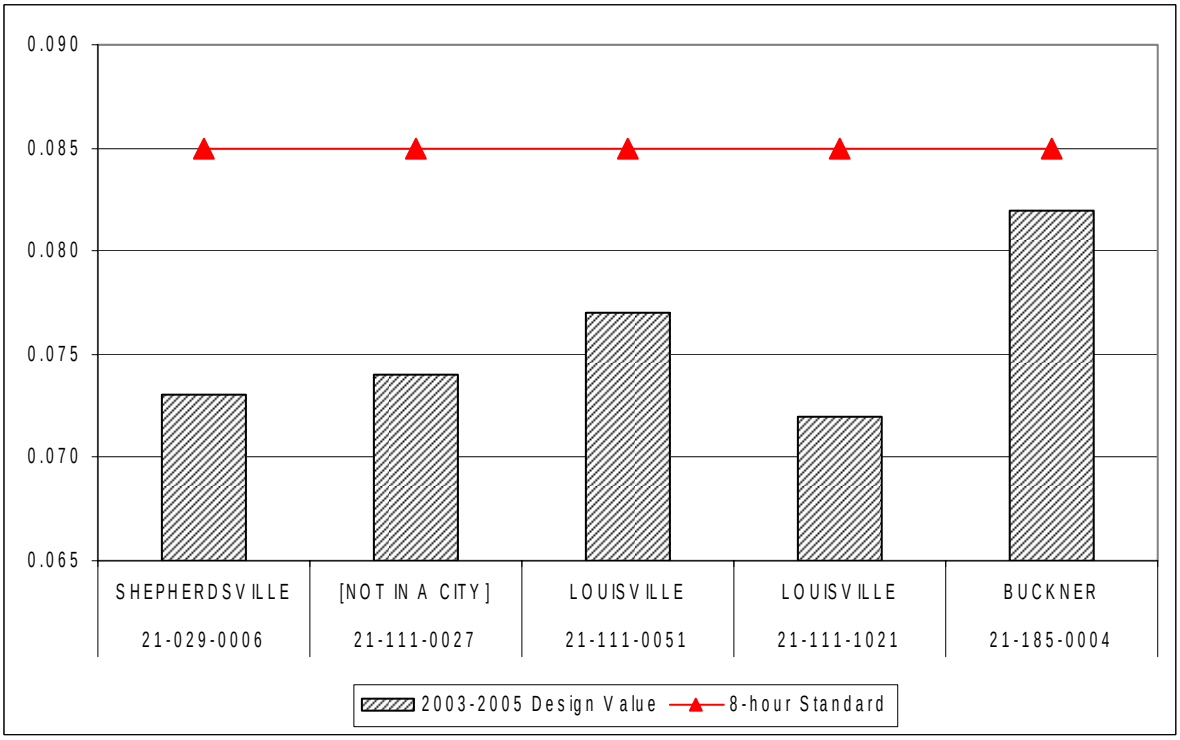
Graph 3.1 visually demonstrates the design values for Indiana's portion of the nonattainment area.

Graph 3.1 - 2003-2005 Design Values for Clark and Floyd Counties (Indiana's Portion of Nonattainment Area)



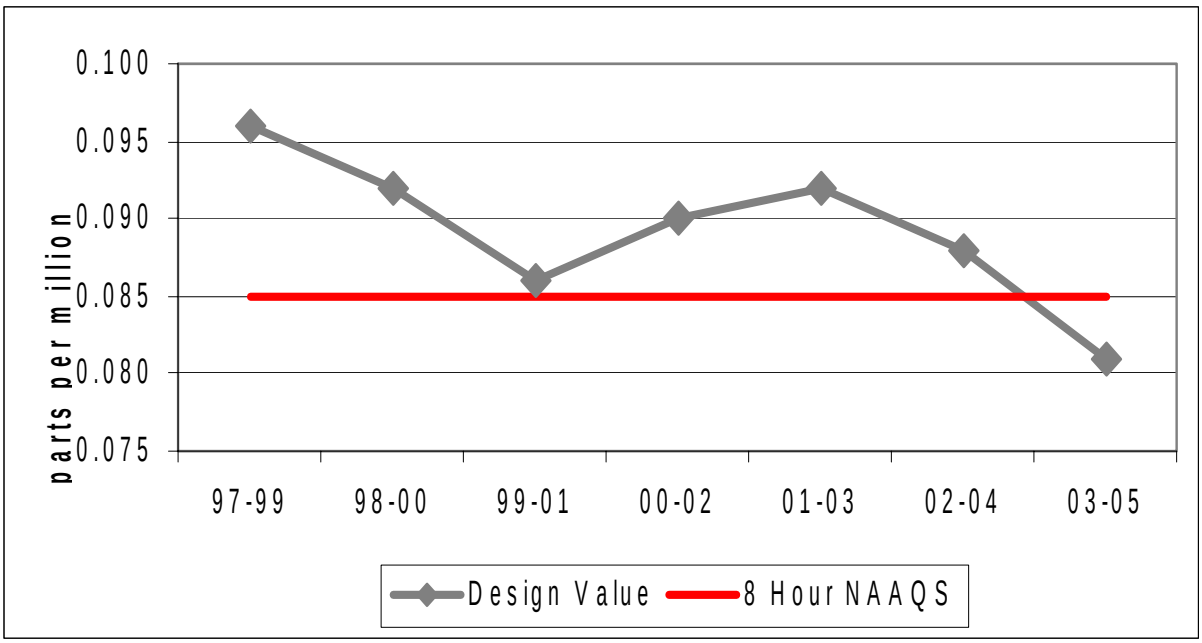
Graph 3.2 illustrates the design values for the Kentucky portion of the nonattainment area.

Graph 3.2 - 2003-2005 Design Values for Kentucky's Portion of Nonattainment Area



The design values for Clark and Floyd counties, along with the nonattainment area in its entirety, demonstrate that the NAAQS for ozone have been attained.

Graph 3.3 1997 through 2005 8-hour Design Values for Clark and Floyd Counties



Graph 3.3 shows the trend in design values for Clark and Floyd Counties over the past seven years. The Charlestown monitor, in Clark County, Indiana, has traditionally served as the controlling ozone monitor for the Louisville basic ozone nonattainment area. A comprehensive list of the sites' design values is in Appendix A. The area's design value has trended downward as emissions have declined due to such programs as the Acid Rain program and cleaner automobiles and fuels both regionally and locally. U.S. EPA's rule to control nitrogen oxides from specific source categories (40 CFR Parts 51, 72, 75 and 96, published on October 17, 1998 and referred to as the "NO_x SIP Call") has significantly reduced emissions from large electric generating units (EGUs), industrial boilers, and cement kilns. Indiana's NO_x Rule was adopted on June 6, 2001 (326 IAC 10-3 and 10-4). An analysis of meteorological conditions and monitoring values is in Section 7.0 and supports the conclusion that attainment of the standard as of 2005 is not the result of unusually favorable meteorological conditions. It is expected that this downward trend will continue as the above programs continue and the U.S. EPA Clean Air Interstate Rule is implemented.

3.3 Quality Assurance

IDEM has quality assured all data shown in Appendix A in accordance with 40 CFR 58.10 and the Indiana Quality Assurance Manual. IDEM has recorded the data in the AQS database and, thus, they are available to the public.

3.4 Continued Monitoring

Indiana commits to continue monitoring ozone levels at or near the sites indicated in Table 3.1 and Appendix A. IDEM will consult with U.S. EPA Region V staff prior to making changes to

the existing monitoring network, should changes be necessary in the future. IDEM will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Connection to a central station and updates to the IDEM website[1] will provide real time availability of the data and knowledge of any exceedances. IDEM will enter all data into AQS on a timely basis in accordance with federal guidelines.

4.0 EMISSION INVENTORY

Clark and Floyd Counties are part of the Louisville metropolitan area but account for a relatively small portion of the overall emissions inventory. The impact of the NO_x SIP call on monitor values in Clark and Floyd Counties demonstrate the area is affected by transport. Therefore, regional emission reductions affect ozone levels in Clark and Floyd Counties far more so than emission reductions within the counties themselves. Graphs 4.2 and 4.7 demonstrate the most relevant regional reduction in NO_x that is attributable to the lowered ozone concentrations in Clark and Floyd Counties. Because of the significance of regional emissions reductions, Section 4.0 summarizes both regional and local emissions information.

U.S. EPA's Redesignation Guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (VOC and NO_x) representative of the year when the area achieves attainment of the ozone air quality standard. Indiana must also demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other emissions inventory related requirements include a projection of the emission inventory to a year at least ten (10) years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the ozone standard, and a commitment to provide future updates of the inventory to enable tracking of emission levels during the ten (10) year maintenance period.

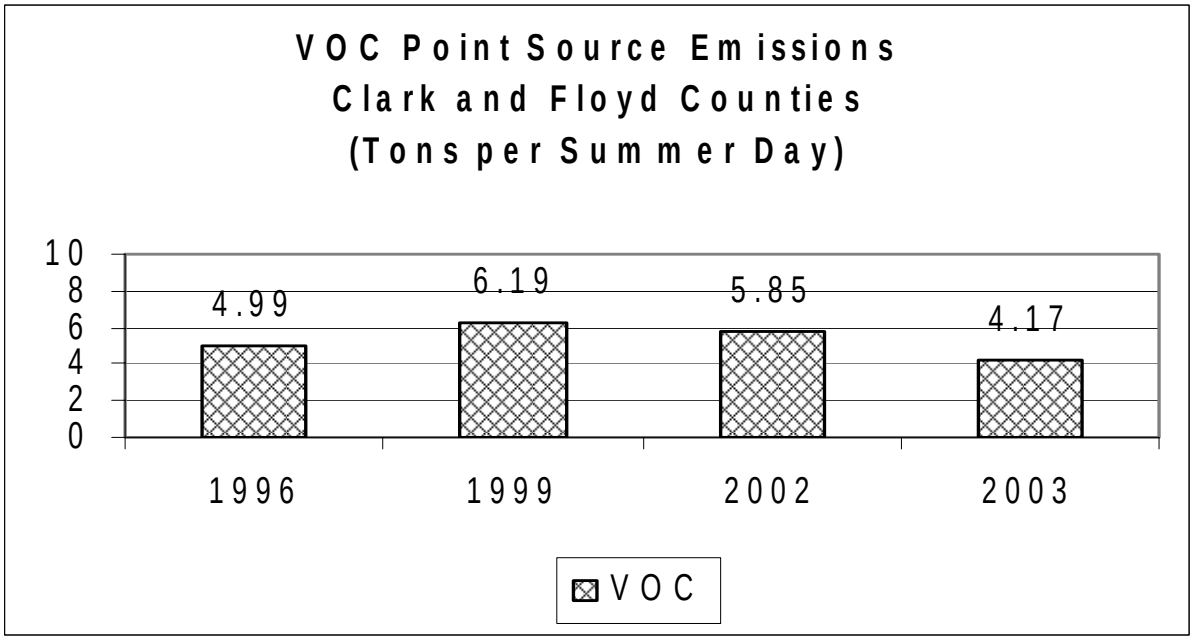
The following subsections address each of these requirements.

4.1 Emission Trends

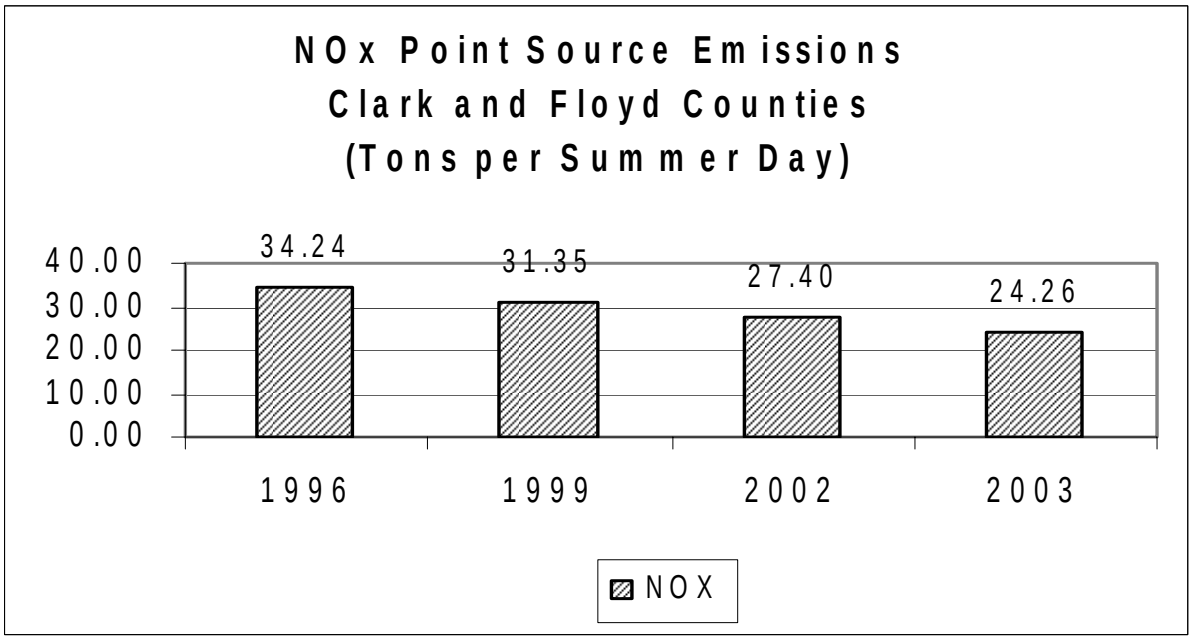
Graphs 4.1 and 4.2 show the trend in point source emissions of VOC and NO_x respectively that generally correspond to the years of monitored values referenced in this petition. The point source data are taken from Indiana's annual emissions reporting program.

1 www.in.gov/idem/

Graph 4.1 Clark and Floyd Counties, Indiana VOC Point Source Emissions 1996 - 2003



Graph 4.2 Clark and Floyd Counties, Indiana NO_x Point Source Emissions 1996 – 2003



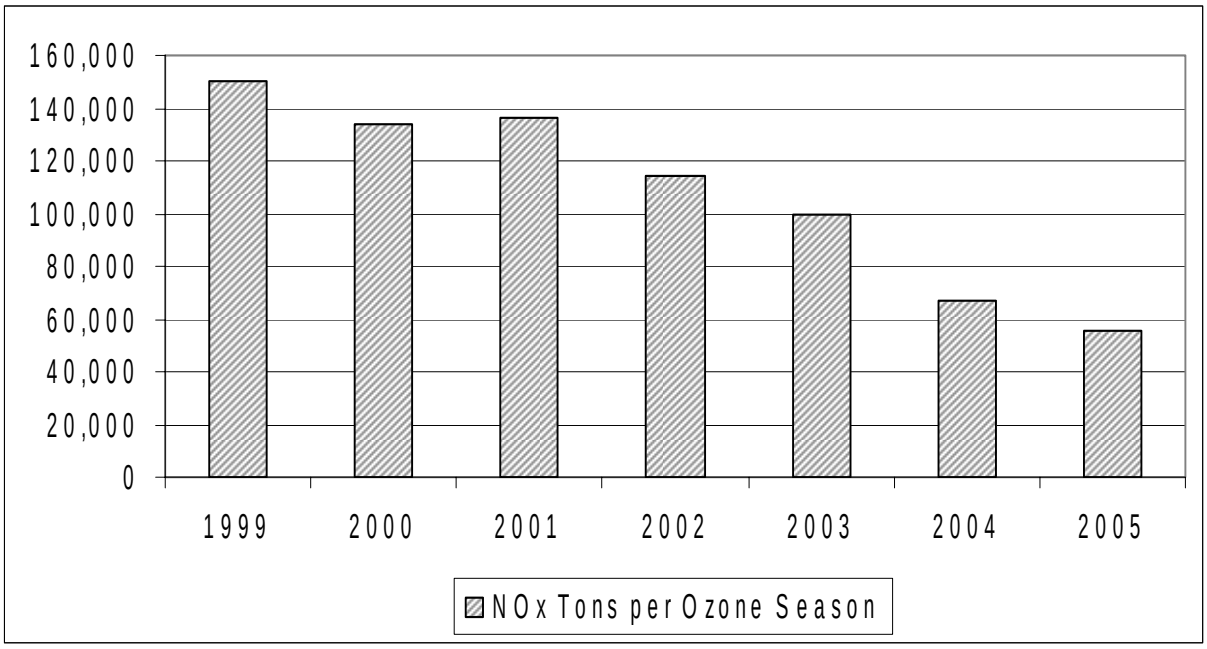
EGU Sources

Graph 4.3 depicts the trends in statewide NO_x emissions from EGUs. While ozone and its precursors are transported into this region from outside the area, this information does provide some indication of the impact that Indiana sources may have on the nonattainment area. The emissions are decreasing substantially in response to national programs affecting all EGUs such as the Acid Rain program and the NO_x SIP Call. Other sectors of the inventory also impact ozone formation, but large regional sources such as EGUs have a substantial impact on the formation of ozone.

These data were taken from U.S. EPA's Clean Air Markets database[2]. Data are available sooner for these units than other point sources in the inventory because of the NO_x SIP Call budget and trading requirements. Information from 2003 is significant because some EGUs started operation of their NO_x SIP Call controls in order to generate Early Reduction Credits for their future year NO_x budgets. The first season of the SIP Call budget period began May 31, 2004.

As part of the NO_x SIP Call, the states were required to adopt into their rules a budget for all large EGUs. Indiana's budget is referenced in 326 IAC 10-4. The budget represents a statewide cap on NO_x emissions. Although each unit is allocated emissions based upon historic heat input, utilities can meet this budget by over-controlling certain units or purchasing credits from the market to account for overages at other units. To summarize, NO_x emissions have dramatically decreased over the years represented on these graphs. These emissions, capped by the state rule, should remain at least this low through the maintenance period covered by this request.

Graph 4.3 Statewide NO_x Emissions from Electric Generating Units 1999 - 2005



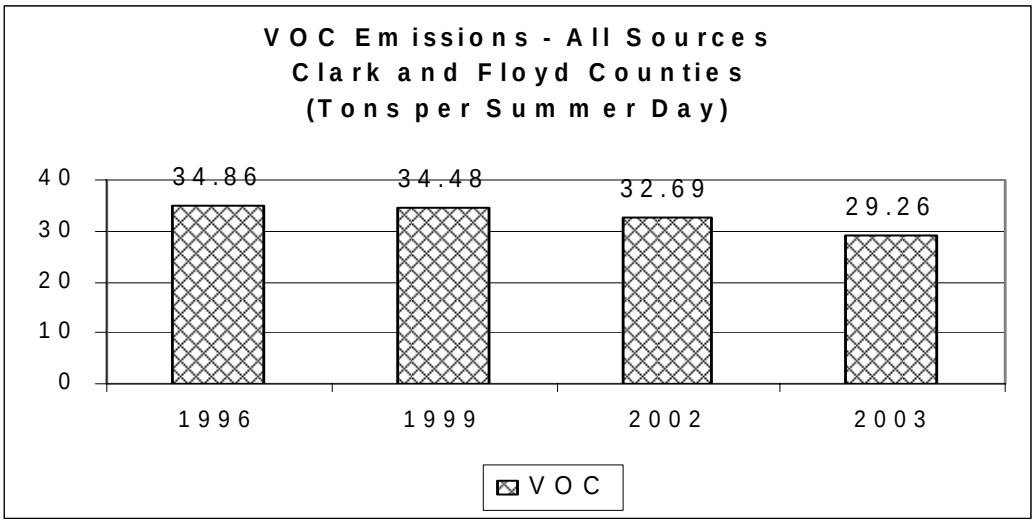
All Anthropogenic Sources

Periodic inventories, which include emissions from all sectors - mobile, area, non-road, and point sources – were prepared for 1996, 1999, 2002 and 2003. Graphs 4.4 and 4.6 show the trend for the total emissions for all anthropogenic source categories in these years. Graphs 4.5

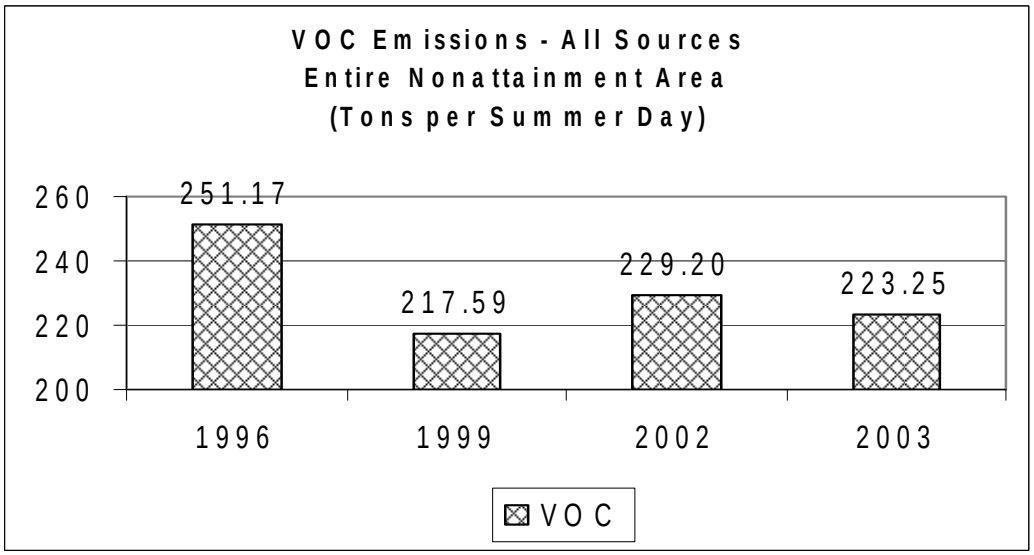
[2] http://www.epa.gov/airmarkets

and 4.7 below show the trend in VOC and NO_x emissions, respectively, for the entire nonattainment area, which also roughly follow the years of monitored trends discussed in Section 3.0. Graphs and data tables for emissions for each source category are available in Appendix B.

Graph 4.4 VOC Emissions Trends, 1996 - 2003, All Sources in Clark and Floyd Counties, Indiana

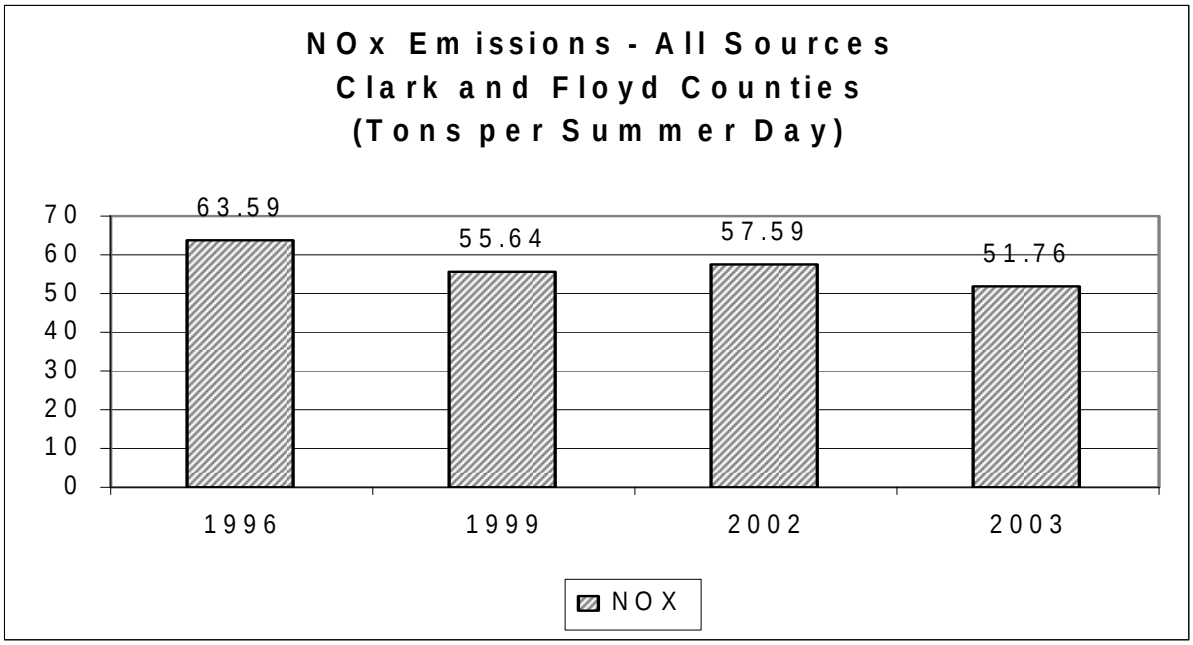


Graph 4.5 Total VOC Emissions Trends, 1996 - 2003, Entire Nonattainment Area

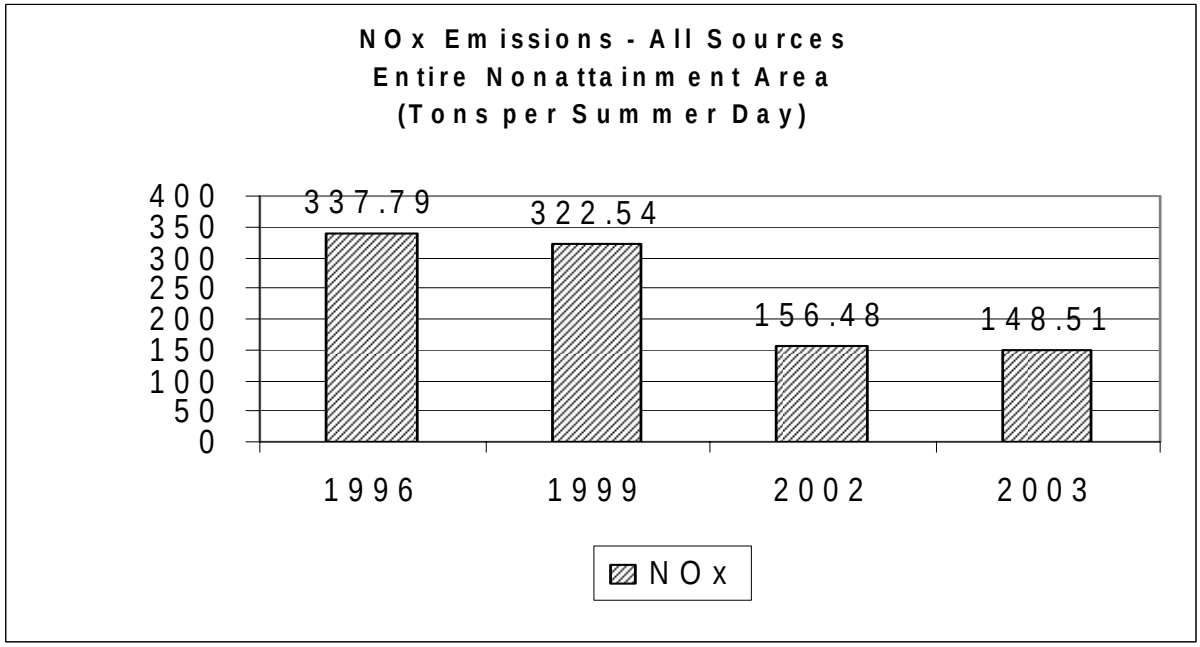


Note: Kentucky emissions data is preliminary and subject to possible change.

Graph 4.6 NO_x Emissions Trends, 1996 - 2003, All Sources in Clark and Floyd Counties, Indiana



Graph 4.7 Total NO_x Emissions Trends, 1996 - 2003, Entire Nonattainment Area



Note: Kentucky emissions data is preliminary and subject to possible change.

Graph 4.4 shows a consistent decrease in VOC emissions for Clark and Floyd Counties. Although graph 4.6 shows a slight increase in NO_x emissions for Clark and Floyd Counties from 1999 to 2002, the overall reduction of VOC and NO_x emissions for the entire nonattainment area clearly demonstrate the downward emissions trend for the area.

4.2 Base Year Inventory

IDEM prepared a comprehensive inventory for Clark and Floyd Counties, including Area, Mobile, and Point sources for precursors of ozone (volatile organic compounds and nitrogen

oxides) for base year 2003.

- Area source emissions for the 1996 and 1999 inventories were generated by U.S. EPA and are part of the National Emissions Inventory (NEI). The 2003 area sources were projected from the Indiana 2002 periodic inventory submitted to U.S. EPA. These projections were derived by applying growth factors developed under contract for LADCO modeling.
- Mobile source emissions for 1996 and 1999 were generated by U.S. EPA and are part of the National Emissions Inventory (NEI). The 2003 mobile source emissions were calculated from MOBILE6 produced emission factors.
- Point source information for 1996 and 1999 was compiled from IDEM's 1996 and 1999 annual emissions statement database. Point source information for the 2003 analysis was compiled from IDEM's 2003 annual emissions statement database and the 2003 U.S. EPA Air Markets acid rain database[3] .
- Biogenic emissions are not included in these summaries.
- Non-road emissions for 1996 and 1999 were generated by U.S. EPA and are part of the National Emissions Inventory (NEI). The 2003 emissions were generated by IDEM using the new non-road estimation model provided by U.S. EPA. To address concerns about the accuracy of some of the categories in U.S. EPA's Non-road emissions model, the Lake Michigan Air Directors' Consortium (LADCO) (Midwest Regional Planning Organization), contracted with two (2) companies to review the base data and make recommendations. Emissions were estimated for commercial marine vessels and railroads. Recreational motorboat population and spatial surrogates (used to assign emissions to each county) were significantly updated. The populations for the construction equipment category were reviewed and updated based upon surveys completed in the Midwest and the temporal allocation for agricultural sources was also updated. One of the contractors also estimated emissions for two (2) non-road categories not included in U.S. EPA's Non-road model.

Appendix B contains data tables and graphs of all these emissions.

4.3 Emission Projections

In consultation with the U.S. EPA and other stakeholders, IDEM selected the year 2020 as the maintenance year for this redesignation request. This document contains projected emission inventories for 2011 and 2020.

IDEM performed emission projections for Clark and Floyd Counties using the following approaches:

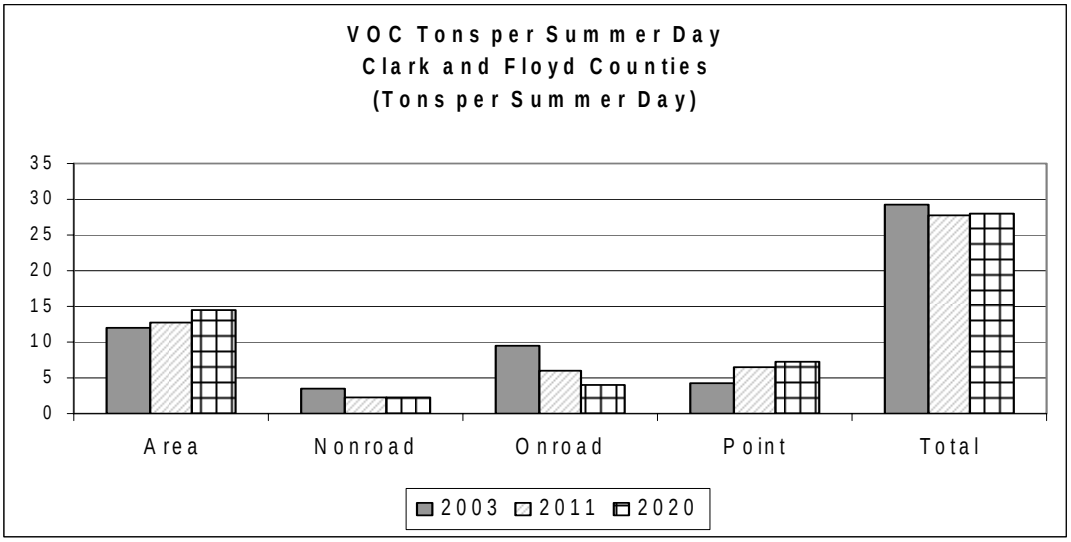
- Mobile source emission projections are based on the U.S. EPA MOBILE6 model. The analysis is described in more detail in Section 5.0. All projections were made in accordance with "Procedures for Preparing Emissions Projections"; U.S. EPA-45/4-91-019.
- Mobile source emission projections for 2011 and 2020 exclude reductions associated with the State of Indiana's vehicle inspection and maintenance program currently in place in Clark and Floyd Counties, Indiana.

3 http://www.epa.gov/airmarkets/acidrain

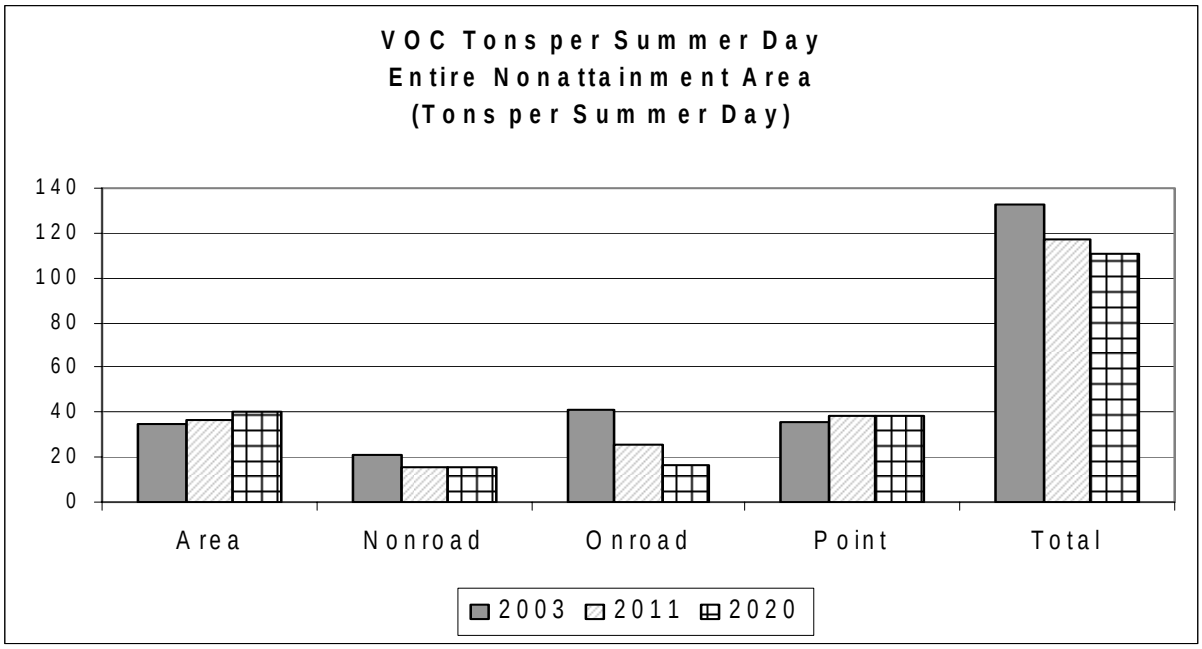
- Emission inventories are required to be projected to future dates to assess the influence growth and future controls will have. The Midwest Regional Planning Organization (Midwest RPO) has developed growth and control files for Point, Area, and Non-road categories. These files were used to develop the future year emissions estimates used in this document. This was done so that the inventories used for redesignation are consistent with modeling performed in the future.

The detailed inventory information for Clark and Floyd Counties for 2011 and 2020 is in Appendix B. Emission trends are an important gauge for continued compliance of the ozone standard. Therefore, IDEM performed an initial comparison of the inventories for the base year (2003), interim year (2011), and maintenance year (2020) for Clark and Floyd Counties, as well as the entire nonattainment area. Graphs 4.8 and 4.10 visually compare the 2003 (base year) estimated emissions with the 2011 and 2020 projected emissions for Clark and Floyd Counties. Graphs 4.9 and 4.11 visually compare the 2003 (base year) estimated emissions with the 2011 and 2020 projected emissions for the entire nonattainment area. Mobile Source emission inventories are described in Section 5.0. In addition to the Midwest RPO's estimates, emissions were projected based upon the statewide EGU NO_x budgets from the Indiana NO_x rule for affected sources.

Graph 4.8 Comparison of 2003, 2011 and 2020 Projected VOC Emissions for Clark and Floyd Counties

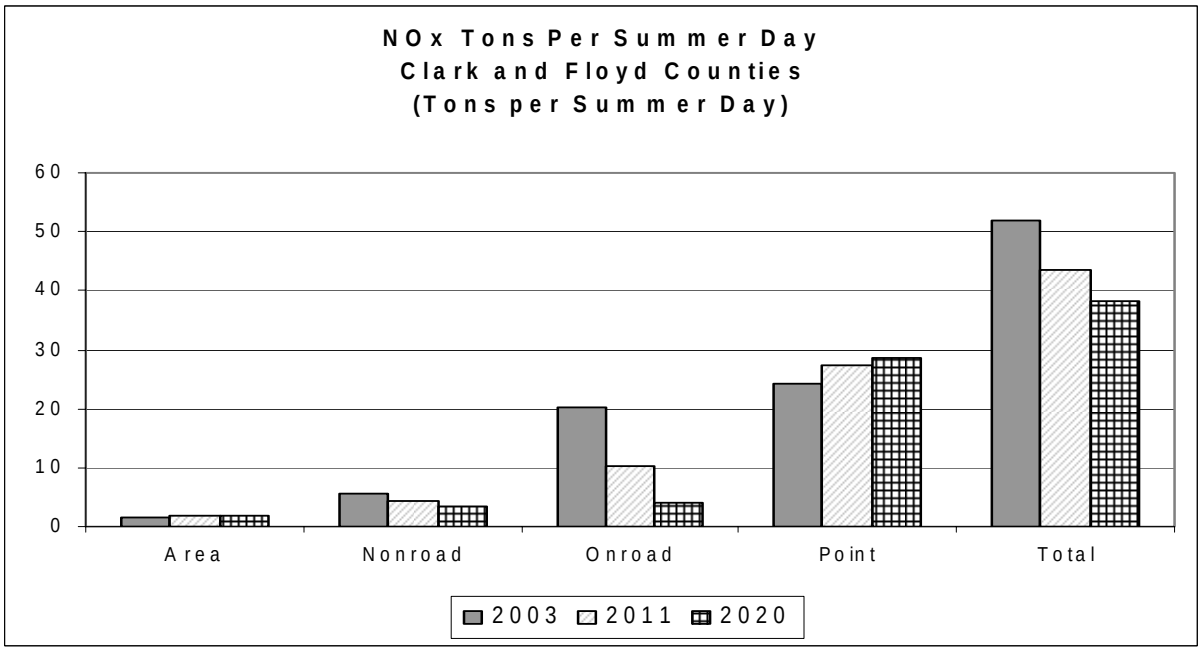


Graph 4.9 Comparison of 2003 Estimated and 2011 and 2020 Projected VOC Emissions for Entire Nonattainment Area

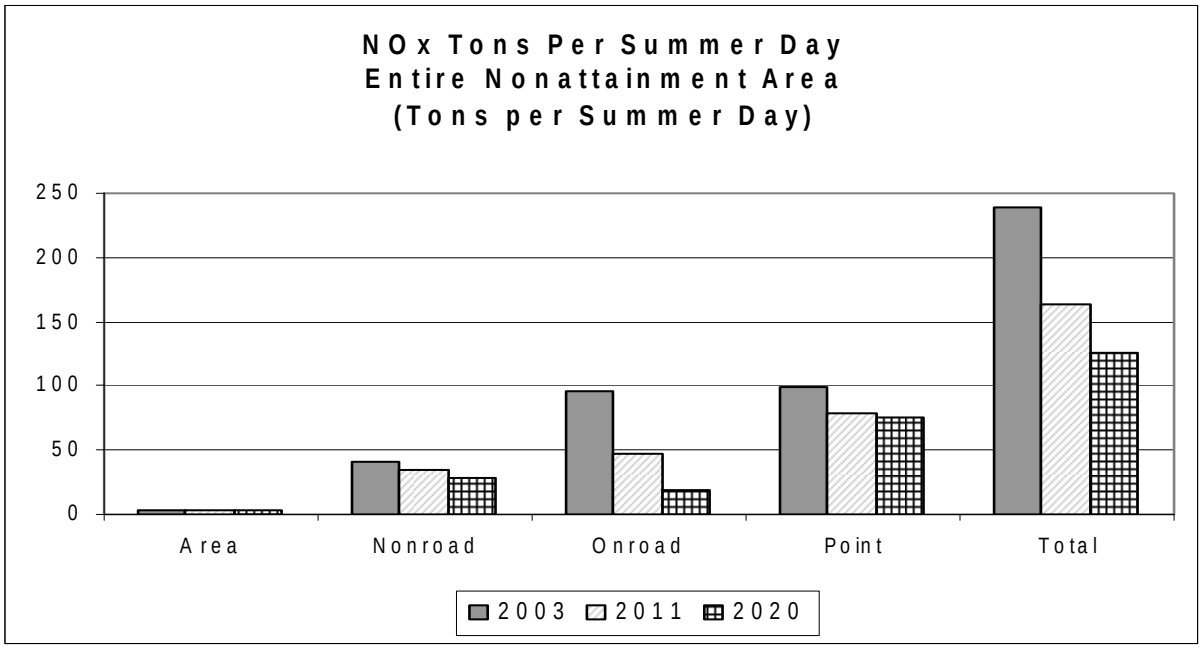


Note: Kentucky emissions data is preliminary and subject to possible change.

Graph 4.10 Comparison of 2003, 2011 and 2020 Projected NO_x Emissions for Clark and Floyd Counties



Graph 4.11 Comparison of 2003 Estimated and 2011 and 2020 Projected NO_x Emissions for Entire Nonattainment Area



Note: Kentucky emissions data is preliminary and subject to possible change.

TABLE 4.1 Comparison of 2003 and 2020 Projected Emission Estimates in Tons per Summer Day, Clark and Floyd Counties, Indiana

	2003	2020	Change	% Change
VOC	29.26	27.91	**-1.35**	**-4.61**
NO_x	51.77	38.10	**-13.67**	**-26.40**

TABLE 4.2 Comparison of 2003 and 2020 Projected Emission Estimates in Tons per Summer Day for Entire Nonattainment Area

	2003	2020	Change	% Change
VOC	133.11	110.97	**-22.14**	**-16.66**
NO_x	238.77	126.25	**-112.52**	**-47.12**

Note: Kentucky emissions data is preliminary and subject to possible change.

VOC emissions within Clark and Floyd Counties are projected to decline by nearly 5% between 2003 and 2020. VOC emissions within the entire nonattainment area are projected to decrease by over 16%. Areas source emissions, and, to a lesser extent, point sources show an increase due to expectations that population will grow considerably in Clark and Floyd Counties.

NO_x emissions within Clark and Floyd Counties are projected to decrease by over 26% between 2003 and 2020. NO_x emissions within the entire nonattainment area are projected to decrease by over 47%. In 2003, mobile sources comprised over 58% of the inventory. Emission reduction benefits from U.S. EPA rules covering the NO_x SIP Call, Tier 2 Motor Vehicle Emissions

Standards and Gasoline Sulfur Control Requirements[4], Highway Heavy-Duty Engine Rule[5] and Non-Road Diesel Engine Rule[6] are factored into the changes. Further, due to implementation of the NO_x SIP Call across the eastern United States, NO_x and ozone levels entering this area will also decrease. The Clean Air Interstate Rule (CAIR), issued in March 2005 and to be implemented in late 2006, will reduce regional EGU NOx emissions by approximately another 15% in 2015. Since CAIR is a regional cap and trade program, it cannot be predicted at this time what effect this will have on EGU units located in Floyd County or other upwind counties. Therefore, potential reductions are not included in Graph 4.6 or Table 4.1.

4.4 Demonstration of Maintenance

Ambient air quality data from all monitoring sites indicate that air quality in Clark and Floyd Counties met the NAAQS for ozone in 2005. Furthermore, ambient air quality data from all monitoring sites within the entire nonattainment area indicate that air quality met the NAAQS for ozone in 2005. U.S. EPA's Redesignation Guidance (Page 9) states, "A state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emissions rates will not cause a violation of the NAAQS." Emissions projections outlined in Section 4.0 of this document clearly illustrate that VOC and NO_x emissions will continue to decline between the years of 2003 (base year) and 2020. The NO_x SIP rule will result in major reductions of EGU emissions (see Section 6.3). Section 7.0 further discusses the implications of these emissions trends and provides an analysis to support these conclusions. Therefore, air quality should meet the ozone NAAQS through the projected year of 2011 and 2020.

In Indiana, major point sources in all counties are required to submit air emissions information once every three (3) years or annually, if VOC potential to emit is greater than 250 tons or NO_x greater than 2500 tons, in accordance with the Emission Statement Rule, 326 IAC 2-6. IDEM prepares a new periodic inventory for all ozone precursor emission sectors every three (3) years. These ozone precursor inventories will be prepared for 2005, 2008, and 2011, as necessary, to comply with the inventory reporting requirements established in the CAAA. Emissions information will be compared to the 2003 base year and the 2020 projected maintenance year inventories to assess emission trends, as necessary, to assure continued compliance with the ozone standard.

4.5 Permanent and Enforceable Emissions Reductions

Permanent and enforceable reductions of volatile organic compounds and oxides of nitrogen have contributed to the attainment of the 8-hour ozone standard. Some of these reductions were due to the application of RACT rules and some were due to the application of tighter federal standards on new vehicles. Also, Title IV of the Clean Air Act and the NO_x SIP Call required the reduction of oxides of nitrogen from affected sources. Section 6.0 identifies the emission control measures specific to Clark and Floyd Counties, as well as the implementation status of each

[4] http://www.epa.gov/fedrgstr/EPA-AIR/2000/February/Day-10/a19a.htm
[5] http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm
[6] http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm

measure.

4.6 Provisions for Future Updates

As required by Section 175A(b) of the CAAA, Indiana commits to submit to the Administrator, eight (8) years after redesignation, an additional revision of this SIP. The revision will contain Indiana's plan for maintaining the national primary ozone air quality standard for ten (10) years beyond the first ten (10) year period after redesignation.

5.0 TRANSPORTATION CONFORMITY BUDGETS

The following is a summary of the detailed mobile input and output calculation files located in Appendix E.

5.1 Overview

The Kentuckiana Regional Planning and Development Agency (KIPDA) is the Metropolitan Planning Organization (MPO) for Clark and Floyd Counties in Indiana as well as Jefferson , Bullitt and Oldham Counties in Kentucky. This organization has a travel demand forecasting model that is used to simulate the traffic in the area and is used to predict what that traffic would be like in future years given growth expectations. The model is used mostly to identify where travel capacity will be needed and to determine the infrastructure requirements necessary to meet that need. It is also used to support the calculation of mobile source emissions. The travel demand forecasting model is used to predict the total daily Vehicle Miles Traveled (VMT) and an EPA software program called MOBILE6 is used to calculate the emissions per mile. The product of these two outputs, once combined, is the total amount of pollution emitted by the on-road vehicles for the particular analyzed area.

For the Louisville nonattainment area, a number of agencies are involved in the emissions analysis. The Louisville Metro Air Pollution Control District (APCD) is the local air quality agency. Staff at this agency create the MOBILE6 input files used to determine the emission factors for the nonattainment area other than Bullitt and Oldham Counties. KIPDA determines the average summer weekday VMT using output from the travel model and the APCD emission factors are used to calculate the emissions for Clark, Floyd and Jefferson (KY) Counties. The Kentucky Division for Air Quality (KYDAQ) determines the emission factors and the final emission totals for Bullitt and Oldham Counties using VMT and speed estimates developed by the Kentucky Transportation Cabinet (KYTC).

5.2 Emission Estimations

Table 5.1 outlines the on-road emission estimates for the entire nonattainment area for the years 2003, 2011, and 2020. The 2003 emission estimates are based on the actual travel demand model network for the year 2003. The 2020 emission estimates are based on the travel demand model network projected to exist for 2020 under the 2030 Transportation Plan. The 2011 emission estimates are interpolated values based on the travel demand model network projected to exist for 2009 and 2012 under the 2030 Transportation Plan. The emission estimates for Bullitt and Oldham Counties have been developed by KYDAQ using VMT and speed data from the KYTC.

Table 5.1 - Emission Estimations for On-Road Mobile Sources

Louisville NA Area	2003	2011	2020
VOC (tons/day)	40.97	25.69	16.89
NOx (tons/day)	95.51	47.53	19.62
Clark & Floyd subtotal			
VOC (tons/day)	9.60	6.12	3.98
NOx (tons/day)	20.27	10.20	4.15
Clark & Floyd subtotal %			
VOC (tons/day)	23.4%	23.8%	23.6%
NOx (tons/day)	21.2%	21.5%	21.2%

Table 5.2 contains the 2020 motor vehicle emissions budget for the nonattainment area.

Table 5.2 – Mobile Vehicle Emission Budgets

	2003	2020
VOC (tons/day)	40.97	22.92
NOx (tons/day)	95.51	29.46

This document creates a single motor vehicle emissions budget for 2003 for the entire nonattainment area that describes the maximum on-road emissions that cannot be exceeded between the years 2003 and 2020. This budget is equal to the on-road emissions calculated for 2003 and is consistent with the methodology and assumptions used for the 2020 budget described below.

This document also creates a single motor vehicle emissions budget for 2020 for the entire nonattainment area. This budget can not be exceeded in conformity analyses for the year 2020 or later conformity-analysis years. This budget includes the emission estimates calculated for 2020 and an additional margin of safety. The safety margins include 6.03 tons/day for VOC and 9.84 tons/day for NOx. These correspond to approximately a 36% and 50% increase from the 2020 on-road emissions, respectively. Margins of safety are used to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions change over time, it is necessary to have a margin of safety that will accommodate the impact of refined assumptions in the process. This budget ensures that the 2020 emissions for both VOC and NO_x will be below the nonattainment area's base year emissions shown in Table 4.2.

All methodologies, latest planning assumptions and the safety margins were determined through the interagency consultation process.

6.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in Clark and Floyd Counties, including CAAA requirements and additional state or local measures

implemented beyond CAAA requirements.

6.1 Reasonably Available Control Technology (RACT)

As required by Section 172 of the CAAA, Indiana in the mid-1990s promulgated rules requiring RACT for emissions of VOCs. There were no specific rules required by the CAA, such as RACT for existing sources, for these two counties beyond statewide rules. Statewide RACT rules have applied to new sources locating in Indiana since that time. The Indiana rules are found in 326 IAC 8. The following is a listing of applicable rules:

326 IAC 8-1-6 BACT for non-specific sources
326 IAC 8-2 Surface Coating Emission Limitations
326 IAC 8-3 Organic Solvent Degreasing Operations
326 IAC 8-4 Petroleum Sources
326 IAC 8-5 Miscellaneous Operation
326 IAC 8-6 Organic Solvent Emission Limitations

6.2 Implementation of Past SIP Revisions

Clark and Floyd Counties were previously nonattainment under the 1-hour ozone standard. The area met all of its 1-hour SIP obligations, and was redesignated to attainment in September of 2001. All of the control measures outlined within the 15% rate of progress (ROP) plan have been fully implemented. Since the area was designated nonattainment for ozone under the 8-hour standard in 2004 and its attainment plan is not due until 2007, now that the area has attained the standard, no further SIP revisions are required.

The following outlines the measures implemented in association with previous SIP submittals that have resulted in permanent and enforceable emission reductions in Clark and Floyd Counties:

Fifteen Percent Rate of Progress (ROP) Plan
Indiana's final 15% ROP plan was approved by U.S. EPA on May 7, 1997. The measures included of a mix of point, area, and mobile source control measures:

Mandatory Measures: The CAAA mandates certain control measures that may be included in a state's 15% plan. These measures include tighter controls on a number of categories of industrial and area sources. The mandatory measures that apply to Clark and Floyd Counties and were included in the 15% plan are:

- controls on automobile refinishing operations,
- wood furniture coatings,
- shipbuilding and ship repair operations,
- architectural and industrial maintenance coatings, and
- volatile organic liquids storage facilities.

All of these measures have been fully adopted and are effective within Clark and Floyd

Counties, with the exception of the architectural and industrial maintenance coatings rule. US EPA indicated in a September 10, 1993 memo from John Seitz, Director of Air Quality Planning and Standards, to Regional US EPA Offices, that states may take credit for this federal rule without conducting state rulemaking. The administrative code citations for the state rules are as follows:

- 326 IAC 8-10. Automobile Refinishing;
- 326 IAC 8-11. Wood furniture Coatings;
- 326 IAC 8-12. Shipbuilding or Ship Repair Operations; and,
- 326 IAC 8-9. Volatile Organic Liquid Storage Vessels.

Additional Measures: In order to achieve the necessary emission reductions, additional measures were selected by Indiana for implementation in Clark and Floyd Counties. The additional measures were:

- Stage II Vapor Recovery at service stations,
- gasoline with lower Reid Vapor Pressure (RVP) than is required under the federal RVP program,
- an upgraded Inspection and Maintenance program for cars and light duty trucks,
- a ban on residential open burning,
- installation of gas collection and combustion equipment at municipal solid waste landfills,
- a ridesharing program, and
- the installation of thermal incinerators at a printing facility in Clark County.

6.3 Nitrogen Oxides (NO_x) Rule

The U.S. EPA NO_x SIP Call required twenty-two (22) states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Indiana adopted this rule in 2001. Beginning in 2004, this rule will account for a reduction of approximately thirty-one percent (31%) of all NO_x emissions statewide compared to previous uncontrolled years.

Twenty-one other states have also adopted these rules. The result is that significant reductions will occur upwind and within the nonattainment area because of the number of large electric utilities located in southern Indiana, Illinois, Kentucky, and Tennessee. U.S. EPA and IDEM performed modeling that indicates this area will attain the 8-hour ozone standard with the implementation of the NO_x SIP Call. Controls for EGUs formally commenced May 31, 2004. From Graph 4.3, "Statewide NO_x Emissions from Electric Generating Units" it can be seen that emissions covered by this program have been generally trending downward since 1998 with larger reduction occurring in 2002 and 2003. Table 6.1, compiled from data taken from the U.S. EPA Clean Air Markets website, quantifies the gradual NO_x reductions that have occurred in Indiana as a result of Title IV of the Clean Air Act Amendments and the beginning of the NO_x SIP Call Rule. This cap will stay in place through 2008, at which time the CAIR program will

supersede it.

Further, U.S. EPA has recently published Phase II of the NO_x SIP Call, that establishes a budget for large (greater than 1 ton per day emissions) stationary internal combustion engines. This rule will decrease emissions statewide from natural gas compressor stations by 4,263 tons during the ozone season. This rule has been adopted and became effective February 26, 2006. Implementation of this rule will be in 2007.

TABLE 6.1 Trends in EGU Ozone Season NO_x Emissions Statewide in Indiana

Year	NO_x Emissions (tons/ozone season)
1997	152,834
1998	159,931
1999	149,827
2000	133,881
2001	136,052
2002	113,996
2003	99,283
2004	66,568
2005	55,486
Cap 2004-2015	43,654
2015 and Beyond	39,273

6.4 Measures Beyond Clean Air Act Requirements

Reductions in ozone precursor emissions have occurred, or are anticipated to occur, as a result of federal control programs. These additional control measures include:

Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light trucks, including sport utility vehicles (SUVs). Under this proposal, automakers will be required to sell cleaner cars, and refineries will be required to make cleaner, lower sulfur gasoline. This rule will apply nationwide. The federal rules will phase in between 2004 and 2009. U.S. EPA has estimated that NO_x emission reductions will be approximately seventy-seven percent (77%) for passenger cars, eighty-six percent (86%) for smaller SUVs, light trucks, and minivans, and sixty-five to ninety-five percent (65-95%) reductions for larger SUVs, vans, and heavier trucks. VOC emission reductions will be approximately twelve percent (12%) for passenger cars, eighteen percent (18%) for smaller SUVs, light trucks, and minivans, and fifteen percent (15%) for larger SUVs, vans, and heavier trucks.

Heavy-Duty Diesel Engines

In July 2000, U.S. EPA issued a final rule for Highway Heavy Duty Engines, a program that includes low-sulfur diesel fuel standards, and will be phased in from 2004 through

2007. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule will result in approximately a forty percent (40%) reduction in NO_x from diesel trucks and buses, a large sector of the mobile sources NO_x inventory.

Clean Air Non-Road Diesel Rule

In May 2004, U.S. EPA issued the Clean Air Non-Road Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard, similar to the highway diesel program. The new standards will cut emissions from non-road diesel engines by over ninety percent (90%). Non-road diesel equipment, as described in this rule, currently accounts for forty-seven percent (47%) of diesel particulate matter (PM) and twenty-five percent (25%) of nitrogen oxides (NO_x) from mobile sources nationwide. Sulfur levels will be reduced in non-road diesel fuel by ninety-nine percent (99%) from current levels, from approximately three-thousand (3,000) parts per million (ppm) now to (fifteen) 15 ppm in 2010. New engine standards take effect, based on engine horsepower, starting in 2008.

Together, these rules will substantially reduce local and regional sources of ozone precursors. The modeling analyses discussed in Section 7 include these rules and show the ozone concentrations expected to result from the implementation of these rules.

6.5 Controls to Remain in Effect

Indiana commits to maintain the control measures necessary to maintain attainment of the ozone standard in Clark and Floyd Counties after redesignation. Indiana will submit to U.S. EPA as a SIP revision any changes to its rules or emission limits applicable to VOC or NO_x sources contained in Indiana's SIP.

The vehicle inspection and maintenance program for Clark and Floyd Counties is currently in effect and will remain so until December 31, 2006. House Enrolled Act No. 1798, effective on July 1, 2003, amended IC 13-17-5 to void the applicability of the vehicle emissions testing rule in Clark and Floyd counties after December 31, 2006. IDEM is preparing a comprehensive photochemical modeling analysis to support a revision to the State Implementation Plan to accommodate the discontinuation of the vehicle inspection and maintenance program for Clark and Floyd counties. This revision to the State Implementation Plan will be submitted to the U.S. EPA for review and consideration later this year, and IDEM will ensure that all applicable Clean Air Act requirements are adequately addressed within the revision.

Indiana, through IDEM's Office of Air Quality and its Office of Enforcement, has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emission of ozone precursors in Clark and Floyd Counties.

6.6 New Source Review Provisions

Indiana has a long standing and fully implemented New Source Review (NSR) program that is outlined in rule 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in 326 IAC 2-2. Indiana's PSD program was conditionally approved on March 3, 2003 (68 FR 9892) and received approval on May 20, 2004 (69 FR 29071) by U.S. EPA as part of the SIP.

Any facility that is not listed in the 2002 emission inventory, or for the closing of which credit was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting all applicable permit rule requirement. The review process will be identical to that used for new sources. Once the area is redesignated, OAQ will implement NSR through the PSD program, which requires an air quality analysis to evaluate whether the new source will threaten the NAAQS.

7.0 MODELING

Although U.S. EPA's redesignation guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed covering southern Indiana to determine the effect of national emission control strategies on ozone levels. These modeling analyses have determined that Clark and Floyd Counties are significantly impacted by ozone and ozone precursor transport, and regional NO_x reductions are an effective way to attain the 8-hour standard in this area. Future year modeled ozone concentrations are expected to be reduced by 10% to 20% from baseline design values. Examples of these modeling analyses are listed below.

7.1 Summary of Modeling Results for National Emission Control Strategies in Final Rulemakings

U.S. EPA Modeling Analysis for HDE Final Rulemaking

U.S. EPA conducted modeling for Tier II vehicles and low-sulfur fuels. This analysis was performed in 2000 to support final rulemaking for the Heavy Duty Engine (HDE) and Vehicle Standards and Highway Diesel Fuel and its expected impact on ozone levels. "Technical Support Document for the Heavy Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements: Air Quality Modeling Analyses" (EPA420-R-00-028) was referenced in support of this ozone redesignation for the two counties. Base year emissions from 1996 were modeled for three ozone episodes: June 12-24, 1995; July 5-15, 1995; and August 7-21, 1995. Results of this modeling show that ozone impacts from these fuel emission control measures, as well as the NO_x SIP call, would be substantial in Clark and Floyd County. Relative Reduction Factors (RRF) were calculated for each monitor in Clark and Floyd County for future years 2007 and 2020. These RRFs were applied to the three-year (2001-2003) design values of 92.0 ppb in Clark County and 86.3 ppb in Floyd County. The resulting future year design values for 2007 and 2020 were calculated and shown below in Table 7.1. The modeled future year design values for all monitors in Clark and Floyd Counties were reduced by 11% to 13% of the 2001-2003 design values and will attain the 8-hour ozone NAAQS of 85 ppb.

Table 7.1 - Modeling Results from U.S. EPA HDE Rulemaking for Clark and Floyd Counties

Monitor ID	Monitor Name	County	Design Value 2001-2003	Modeled Relative Reduction Factor (RRFs)	Future Design Value	Modeled Relative Reduction Factor (RRFs)	Future Design Value
				2007 Base	2007	2020 Base	2020
180190003	Charlestown	Clark	92.0	0.8857	81.5	0.8729	80.3
180431004	New Albany	Floyd	86.3	0.8914	77.0	0.8859	76.5

LADCO Modeling Analysis for 8-Hour Ozone Standard Assessment

The Lake Michigan Air Directors Consortium (LADCO) performed modeling to evaluate the effect of the NO_x SIP Call and Tier II / Low Sulfur rule for future-year 2007 ozone, which included Clark and Floyd Counties. This modeling was originally designed to assess the 1-hour ozone standard. Further analysis was conducted and documented in LADCO's White Paper "8-Hour Ozone Assessment," dated May 2, 2001. Base year design values used were the average of the design values for the three 3-year periods (1994-1996, 1995-1997, and 1996-1998). Base year emissions were taken from 1996 and four ozone episodes were evaluated: June 22-28, 1991; July 14-21, 1991; June 13-25, 1995; and July 7-18, 1995. Results are shown in Table 7.2.

Table 7.2 LADCO Modeling Results for 8-Hour Ozone Assessment

Monitor ID	Monitor Name	County	Base Year Average Design Value (ppb)	Future Design Value
			'94-'96, '95-'97, '96-'98	2007
180190003	Charlestown	Clark	93	84
180431004	New Albany	Floyd	91	84

The resulting future year design values were calculated at 84 ppb for Clark County and Floyd County, respectively. The modeled future year design values will attain the 8-hour ozone NAAQS of 85 ppb with future year concentrations decreasing by 8% to 10%. Base-year average design values (1994-1996, 1995-1997, 1996-1998) used in the LADCO modeling were 6 to 8 ppb greater than current base-year average design values (2001-2003, 2002-2004, 2003-2005) for most monitors. Therefore, the modeling results would be even lower if the current base year average design values were used. The trend for the design values at both monitors has trended downward over this time period.

It should be noted that this modeling was conducted in the year 2000 and used 1996 emission inventories. More recent modeling uses updated emission inventories from 2002 with revised growth factors and control reductions for future year modeling purposes, as well as photochemical modeling updates that better characterize ozone formation and transport. These factors would account for the differences between the older modeling results and current modeling for the NO_x SIP call and CAIR.

7.2 Summary of Modeling Results to Support Rulemakings

U.S. EPA Modeling for Clean Air Interstate Rule (CAIR), 2005

On March 10, 2005, the U.S. EPA finalized the Clean Air Interstate Rule (CAIR). NO_x emissions from power plants will be cut by 1.7 million tons by 2009 and emissions will be reduced by 1.3 million tons in 2015 in 28 eastern states and the District of Columbia. Compared to a 2003 baseline, Indiana will reduce NOx emissions by 113,000 tons by 2009 and 149,000 tons by 2015.

U.S. EPA performed modeling to support the associated emission reductions. The modeling was based on 1999 – 2003 design values. Future year modeling was conducted, including Clark and Floyd Counties, and the future year design values for 2010 and 2015 were evaluated for attainment of the 8-hour ozone NAAQS, as shown below in Table 7.3. This future year modeling excluded reductions associated with the State of Indiana's vehicle inspection and maintenance program currently in place in Clark and Floyd Counties, Indiana. Results of the CAIR modeling show that both counties will attain the 8-hour ozone NAAQS in 2010 with modeled concentrations reduced by 10 % to 12% and remain below 85 ppb. With further reductions projected in CAIR for 2015, all design values continue to decrease by 16% to 18% and continue to attain the 8-hour ozone NAAQS.

Table 7.3 Modeling Results from U.S. EPA for the Clean Air Interstate Rule

County	MSA/CMSA	Design Value (ppb)	Future Design Value	Future Design Value
		1999-2003	2010 with CAIR	2015 with CAIR
Clark	Louisville	89.3	78.4	73.5
Floyd	Louisville	83.7	75.2	70.3

LADCO modeling for Clean Air Interstate Rule (CAIR)

LADCO conducted modeling in March of 2006 to determine the impact of CAIR in the Midwest. The modeling was based on 2000-2004 design values. Future year modeling for 2009 and 2012 was conducted and the future year design values were determined, as shown below in Table 7.4.

Table 7.4 LADCO's Round 4 Modeling Results for the Clean Air Interstate Rule

Monitor ID	Monitor Name	County	Design Value 2000-2004	Basecase with CAIR - 2009	Basecase with CAIR - 2012
			(ppb)	(ppb)	(ppb)
180190003	Charlestown	Clark	90.0	82.5	79.2
180431004	New Albany	Floyd	84.3	77.4	75.7

Results of LADCO's most recent CAIR modeling show Clark and Floyd Counties will attain the 8-hour ozone NAAQS of 85 ppb in 2009. Future year modeled ozone concentrations for 2009 will be 8% lower than baseline ozone design values and 12% lower in 2012. Ozone

concentrations are predicted to continue to decrease and remain in attainment of the 8-hour ozone NAAQS of 85 ppb.

7.3 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling for future year design values have consistently shown that existing national emission control measures will bring Clark and Floyd Counties into attainment of the 8-hour ozone NAAQS. Rulemakings to be implemented in the next several years will provide even greater assurance that air quality will continue to meet the standard into the future.

Modeling support for the NO_x SIP Call, Heavy Duty Engine and Highway Diesel Fuel and Tier II/Low Sulfur Fuel and Clean Air Interstate Rule has shown that future year design values for Clark and Floyd Counties will attain the ozone standard with modeled future year design values below 85 ppb. U.S. EPA has modeled base case future years with existing emission controls only and shown that Clark and Floyd Counties will attain the 8-hour ozone NAAQS without additional national emission control strategies. Future national and local emission control strategies will ensure that each county's attainment will be maintained with an increasing margin of safety over time.

7.4 Temperature Analysis for Clark and Floyd County

Meteorological conditions are one of the most important factors that influence ozone development and transport. A temperature analysis has been conducted to determine how the temperatures during the ozone conducive months of April, May, June, July, August, September and October compare to normal temperatures for the Southern Indiana. Temperature information was taken from the Charlestown Ordinance Plant in Clark County, Indiana and National Weather Service Station at Standiford International Airport in Louisville, Kentucky. Available normal maximum temperatures by summer months from 1971-2000 for the Southern Indiana/ Louisville, Kentucky area are as follows:

April – 66.8^{o} F
May – 75.4^{o} F
June – 83.3^{o} F
July – 87.0^{o} F
August – 85.8^{o} F
September – 79.4^{o} F
October – 68.4^{o} F
May - September – 82.2^{o} F

Louisville's monthly maximum temperatures for the previous 8 years (1998 – 2005) during the summer months are compared to normal summer month temperatures in Table 7.5. Overall, the temperatures during the 1998, 1999, 2002 and 2005 summer months of May, June, July, August, and September were 2% to 4% above normal while temperatures during the 2000, 2001, 2003 and 2004 summer months were at normal or 1% lower than the normal temperatures. Table 7.5 shows the average temperatures in Southern Indiana for each of the past eight years and the percent difference from normal for each year.

Table 7.5 Analysis of Maximum Temperatures for Clark/Floyd Counties

(Percent Change from Maximum Temperature (^{o}F) Normals (1971 – 2000))

	Normal	1998		1999		2000		2001	
	Max	**Max**	**%**	**Max**	**%**	**Max**	**%**	**Max**	**%**
April	68.0	64.0	-4	67.6	+1	65.7	-2	72.6	+9
May	77.2	78.8	+5	78.1	+4	78.7	+4	77.6	+3
June	84.7	82.7	-1	82.8	-1	83.8	+1	82.4	-1
July	88.5	84.1	-3	91.9	+6	84.6	-3	86.6	0
August	87.2	86.4	+1	88.6	+3	85.4	0	87	+1
September	80.6	86.5	+9	85.4	+8	77.4	-3	77.5	-2
October	70.1	70.6	+3	70.7	+3	73.2	+7	68.8	+1
AVE. May-Sept.	**83.6**	**83.7**	**+2**	**85.4**	**+4**	**82**	**0**	**82.2**	**0**
AVERAGE April-Oct.	**79.5**	**79.0**	**+1**	**80.7**	**+3**	**78.4**	**+1**	**78.9**	**+1**

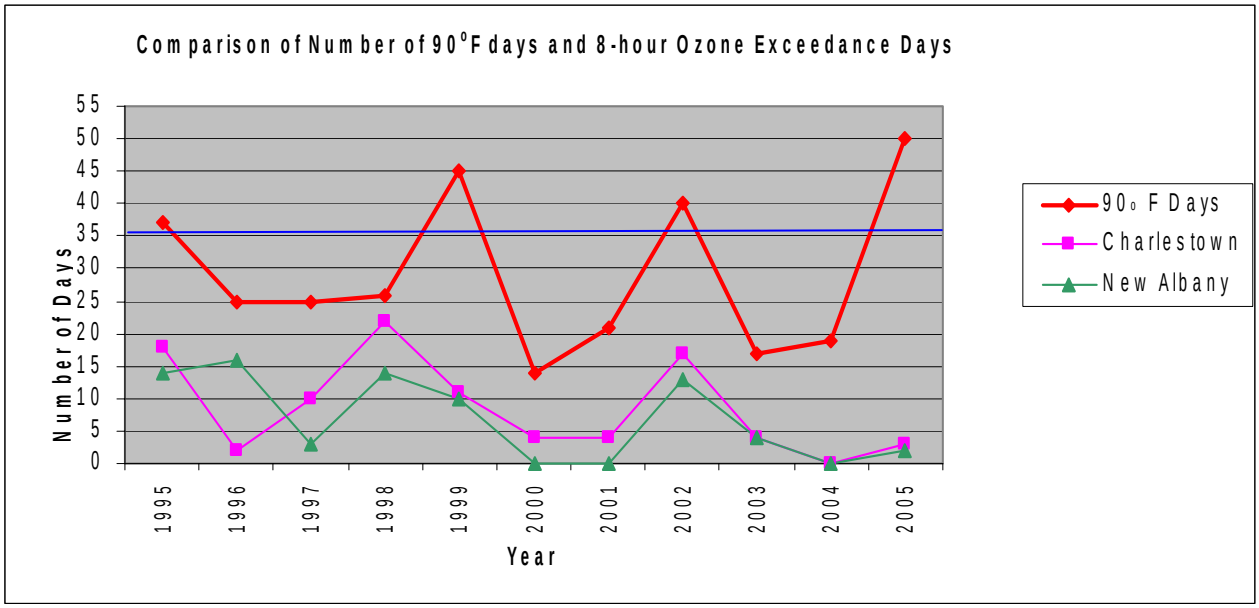
	Normal	2002		2003		2004		2005	
	Max	**Max**	**%**	**Max**	**%**	**Max**	**%**	**Max**	**%**
April	68.0	69.5	+4	69.9	+5	69.2	+4	69.1	+3
May	77.2	73.3	-3	74.5	-1	80.7	+7	75.3	0
June	84.7	85	+2	80.3	-4	84.8	+2	86.3	+4
July	88.5	88.7	+2	86.3	-1	86.1	-1	88.4	+2
August	87.2	88.9	+4	83.0	-3	76.8	-10	90.1	+5
September	80.6	83.4	+5	82.0	+3	77.9	-2	84.0	+6
October	70.1	63.7	-7	70.3	+3	69.5	+2	70.5	+3
AVE. May-Sept.	**83.6**	**83.8**	**+2**	**81.2**	**-1**	**81.3**	**-1**	**84.8**	**+3**
AVERAGE April-Oct.	**79.5**	**78.9**	**+1**	**78.0**	**0**	**77.9**	**0**	**80.5**	**+3**

The number of days with temperatures of 90^{o} F and higher was collected from the National Weather Service Station at Standiford International Airport and compared to the normal number of days collected from the Charlestown ORD Plant in Clark County, Indiana and calculated from 1971 through 2000. The average number of 90^{o} F and higher days for the Louisville area is 35.2. Table 7.6 shows a comparison of 8-hour ozone exceedances and temperatures while Graph 7.2 shows the correlation graphically.

Table 7.6 Comparison of Days with 90^{o} F and 8-Hour Ozone Exceedance Days

Number of Days with Temperatures of 90^{o} F and higher												
	Normal	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
# of 90^{o} F days	**35.2**	**37**	**25**	**25**	**26**	**45**	**14**	**21**	**40**	**17**	**19**	**50**
Number of 8-Hour Exceedance Days at Clark/Floyd County and Louisville area ozone monitors												
Monitor	**County**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Charlestown	Clark	18	2	10	22	11	4	4	17	4	0	3
New Albany	Floyd	14	16	3	14	10	0	0	13	4	0	2

Graph 7.1 Comparison of Days with 90° F and 8-Hour Ozone Exceedance Days



As can be seen, a greater number of ozone exceedance days per year correlate with a greater number of 90° F days per year. The effects of national control measures appear to have an impact on the number of ozone exceedance days per year. This is evident in that 2005 had a greater number of days with temperatures of 90° F or more but the number of 8-hour exceedance days was low. While other meteorological factors may have influenced this to some degree, it appears that the lower emissions helped to keep 8-hour exceedance days lower during the ozone-conducive conditions of 2005.

7.5 Summary of Meteorological Conditions

The analysis of the departure from normal of the maximum temperatures during the summer months shows variation in the number of 90° F days per year as illustrated in Table 7.6. The analysis shows that 30 or more days with temperatures of 90° F and higher occurred in 1995, 1999, 2002 and 2005. The number of 8-hour ozone exceedance days for those years shows a greater correlation to the number of higher temperature days. However, the years with a lesser number of 90° F days still yielded 8-hour ozone exceedance days. Ozone formation in the future

will be influenced less by meteorological conditions. Lower ozone values correspond to lowered local and regional ozone precursor emissions. This is why U.S. EPA developed the 8-hour standard as a 4th high ozone value averaged over 3 years to account for variations in temperature. Despite such variations, ozone values in Clark and Floyd counties have steadily decreased since 1995.

8.0 CORRECTIVE ACTIONS

8.1 Commitment to Revise Plan

As noted in Section 4.6 above, Indiana hereby commits to review its Maintenance Plan eight (8) years after redesignation, as required by Section 175(A) of the CAAA.

8.2 Commitment for Contingency Measures

Indiana hereby commits to adopt and implement expeditiously necessary corrective actions in the following circumstances:

Warning Level Response

A Warning Level Response shall be prompted whenever an annual (1-year) fourth high monitored value of .089 ppm occurs in a single ozone season, or a two (2)-year average fourth high monitored value of .085 parts per million (ppm) or greater occurs within Indiana's portion of the maintenance area. A Warning Level Response will consist of a study to determine whether the ozone value indicates a trend toward higher ozone values or whether emissions appear to be increasing. The study will evaluate whether the trend, if any, is likely to continue and, if so, the control measures necessary to reverse the trend taking into consideration ease and timing for implementation, as well as economic and social considerations. Implementation of necessary controls in response to a Warning Level Response trigger will take place as expeditiously as possible, but in no event later than twelve (12) months from the conclusion of the most recent ozone season (September 30).

Should it be determined through the Warning Level study that action is necessary to reverse the noted trend, the procedures for control selection and implementation outlined under "Action Level Response" shall be followed.

Action Level Response

An Action Level Response shall be prompted whenever a violation of the standard (three (3)-year average fourth high monitored value of .085 parts per million (ppm) or greater) occurs within the maintenance area. In the event that the Action Level is triggered and is not found to be due to an exceptional event, malfunction, or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed

to assure future attainment of NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected in order to be in place within eighteen (18) months from the close of the ozone season that prompted the Action Level.

Control Measure Selection and Implementation

Adoption of any additional control measures is subject to the necessary administrative and legal process. This process will include publication of notices, an opportunity for public hearing, and other measures required by Indiana law for rulemaking by state environmental boards.

If a new measure/control is already promulgated and scheduled to be implemented at the federal or state level, and that measure/control is determined to be sufficient to address the upward trend in air quality, additional local measures may be unnecessary. Furthermore, Indiana will submit to U.S. EPA an analysis to demonstrate the proposed measures are adequate to return the area to attainment.

8.3 Contingency Measures

Contingency measures to be considered will be selected from a comprehensive list of measures deemed appropriate and effective at the time the selection is made. Listed below are example measures that may be considered. The selection of measures will be based upon cost-effectiveness, emission reduction potential, economic and social considerations or other factors that IDEM deems appropriate. IDEM will solicit input from all interested and affected persons in the maintenance area prior to selecting appropriate contingency measures. All of the listed contingency measures are potentially effective or proven methods of obtaining significant reductions of ozone precursor emissions. Because it is not possible at this time to determine what control measure will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not comprehensive. Indiana anticipates that if any contingency measures should ever be necessary, it is unlikely that a significant number (i.e., all those listed below) will be required.

1) Broader geographic applicability of existing measures.

2) Tighten RACT on existing sources covered by U.S. EPA Control Technique Guidelines issued in response to the 1990 CAAA.

3) Apply RACT to smaller existing sources.

4) One or more transportation control measures sufficient to achieve at least a half a percent (0.5%) reduction in actual area wide VOC emissions. Transportation measures will be selected from the following based upon the factors listed above after consultation with affected local governments:

   a) Trip reduction programs, including, but not limited to, employer-based transportation

management plans, area wide rideshare programs, work schedule changes, and telecommuting.

b) Transit improvements.

c) Traffic flow improvements.

d) Other new or innovative transportation measures not yet in widespread use that affects state and local governments deemed appropriate.

5) Alternative fuel and diesel retrofit programs for fleet vehicle operations.

6) Controls on consumer products consistent with those adopted elsewhere in the United States.

7) Require VOC or NO_x emission offsets for new and modified major sources.

8) Require VOC or NO_x emission offsets for new and modified minor sources.

9) Increase the ratio of emission offsets required for new sources.

10) Require VOC or NO_x controls on new minor sources (less than 100 tons).

No contingency measure shall be implemented without providing the opportunity for full public participation during which the relative costs and benefits of individual measures, at the time they are under consideration, can be fully evaluated.

9.0 PUBLIC PARTICIPATION

In accordance with Section 100 (a) (2) of the CAAA, notice of availability of the ozone redesignation documents and the time and date of the public hearing was published in the *Indianapolis Star* (Indianapolis, Indiana)*, The New Albany Tribune*, (New Albany, Indiana) and *The Jeffersonville Evening News* (Jeffersonville, Indiana) for the Indiana portion of the Louisville nonattainment area (Clark and Floyd Counties) on May 15, 2006.

The public hearing to receive comments on the redesignation request was held on June 14, 2006, at Indiana University Southeast in the Multi-Purpose Room, located at 4201 Grant Line Road, in New Albany, Indiana. The public comment period closed on June 21, 2006. A summary of the comments received and IDEM's responses thereto are included in Appendix D as part of the submittal to the U.S. EPA. Appendix D also includes a copy of the public notice, certifications of publication, and the transcript from the public hearing.

10.0 CONCLUSIONS

Clark and Floyd Counties, along with the remaining portion of the Louisville basic ozone nonattainment area, have attained the NAAQS standard for ozone. This petition demonstrates that Clark and Floyd Counties have complied with the applicable provisions of the 1990 Amendments to the Clean Air Act regarding redesignation of basic ozone nonattainment areas.

IDEM has prepared a State Implementation and Maintenance Plan that meets the requirement of Section 110 (a) (1) of the 1990 Clean Air Act.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures. In addition, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standard and that all CAAA requirements necessary for redesignation have been met.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures and that significant regional NO_x reductions following implementation of Phase II NO_x and CAIR will ensure continued compliance (maintenance) with the standard. Based on this presentation, Indiana's portion of the nonattainment area (Clark and Floyd Counties) meets the requirements for redesignation under the CAA (Section 107 (d)(3)) and U.S. EPA guidance. Furthermore, because this area is subject to significant transport of pollutants, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standards with an increasing margin of safety.

Consistent with the authority granted to the U.S. EPA, the State of Indiana hereby requests that Clark and Floyd Counties be redesignated to attainment simultaneously with U.S. EPA approval of the Indiana State Implementation and Maintenance Plan provisions contained herein.

APPENDIX A

Aerometric Information Retrieval System (AIRS) Data

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Dec. 28, 2005

EXCEPTIONAL DATA TYPES

EDT	DESCRIPTION
0	NO EVENTS
1	EVENTS EXCLUDED
2	EVENTS INCLUDED
3	EXCEPTIONAL EVENTS EXCLUDED
4	NATURAL EVENTS EXCLUDED
5	EVENTS WITH CONCURRENCE EXCLUDED
6	EXCEPTIONAL EVENTS WITH CONCURRENCE EXCLUDED
7	NATURAL EVENTS WITH CONCURRENCE EXCLUDED

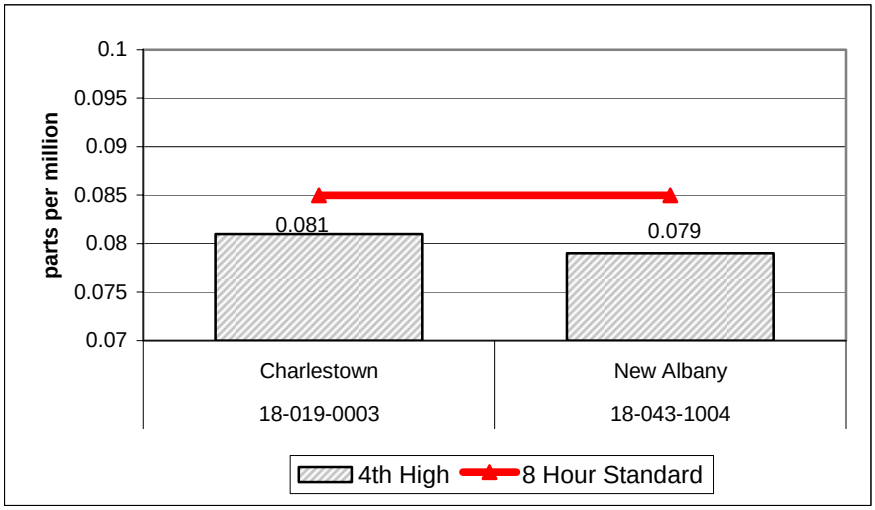
Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Ozone (44201) Indiana PPM (007)
8-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX>/= 0.085	CERT	EDT
18-019-0003	1	520	Charlestown	Clark	ARMY AMMUNITION PLA	2003	47	99	182	183	0.096	0.092	0.092	0.09	4	Y	0
18-019-0003	1	520	Charlestown	Clark	ARMY AMMUNITION PLA	2004	47	99	182	183	0.08	0.078	0.076	0.074	0		0
18-019-0003	1	520	Charlestown	Clark	ARMY AMMUNITION PLA	2005	47	95	173	183	0.098	0.092	0.086	0.08	3		0
18-043-1004	1	520	New Albany	Floyd	2230 GREEN VALLEY R	2003	47	100	183	183	0.097	0.097	0.092	0.086	4	Y	0
18-043-1004	1	520	New Albany	Floyd	2230 GREEN VALLEY R	2004	47	96	175	183	0.079	0.078	0.077	0.071	0		0
18-043-1004	1	520	New Albany	Floyd	2230 GREEN VALLEY R	2005	47	94	172	183	0.092	0.086	0.081	0.08	2		0

City	Site Name	Three Year 8-hr Design Values (ppm)		
		2001-2003	2002-2004	2003-2005
Charlestown	Army Ammunition	0.092	0.088	0.081
New Albany	Green Valley School	0.086	0.084	0.079



Four Highest Daily Values

					1ST	2ND	3RD	4TH	2003-2005

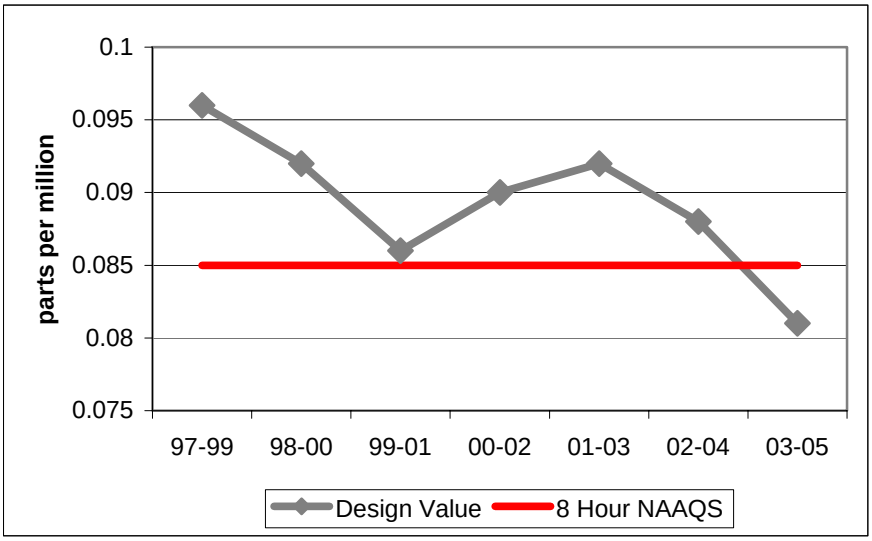
SITE ID	COUNTY	ADDRESS	YEAR	%OBS	8-HR	8-HR	8-HR	8-HR	AVERAGE
18-019-0003	CLARK	CHARLESTOWN	2003	99	0.096	0.092	0.092	0.090	
18-019-0003	CLARK	CHARLESTOWN	2004	99	0.08	0.078	0.076	0.074	
18-019-0003	CLARK	CHARLESTOWN	2005	95	0.098	0.092	0.086	0.080	0.081
18-043-1004	FLOYD	NEW ALBANY	2003	100	0.097	0.097	0.092	0.086	
18-043-1004	FLOYD	NEW ALBANY	2004	96	0.079	0.078	0.077	0.071	
18-043-1004	FLOYD	NEW ALBANY	2005	94	0.092	0.086	0.081	0.080	0.079

Annual 4th High Values

City	Site Name	Yearly Annual 8-hr Values										
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Charlestown	Army Ammunition	.100	.081	.097	.104	.089	.085	.086	.100	.090	.074	.080
New Albany	Green Valley School	.094	.092	.084	.100	.094	.077	.076	.097	.086	.071	.080

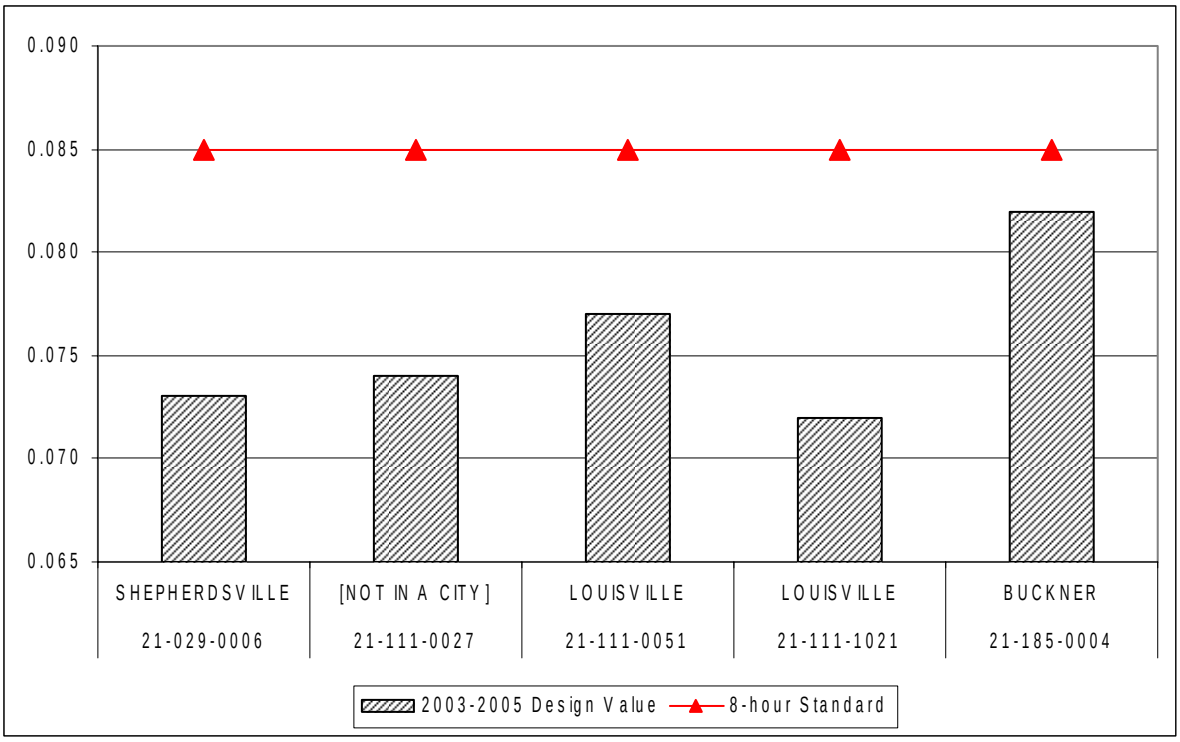
Historic Design Values

City	Site Name	Three Year 8-hr Design Values								
		95-97	96-98	97-99	98-00	99-01	00-02	01-03	02-04	03-05
Charlestown	Army Ammunition	0.092	0.094	0.096	0.092	0.086	0.090	0.092	0.088	0.081
New Albany	Green Valley School	0.090	0.092	0.092	0.090	0.082	0.083	0.086	0.084	0.079



Local Monitoring (Design Value) Data for Bullitt, Jefferson, and Oldham Counties, Kentucky 2003-2005

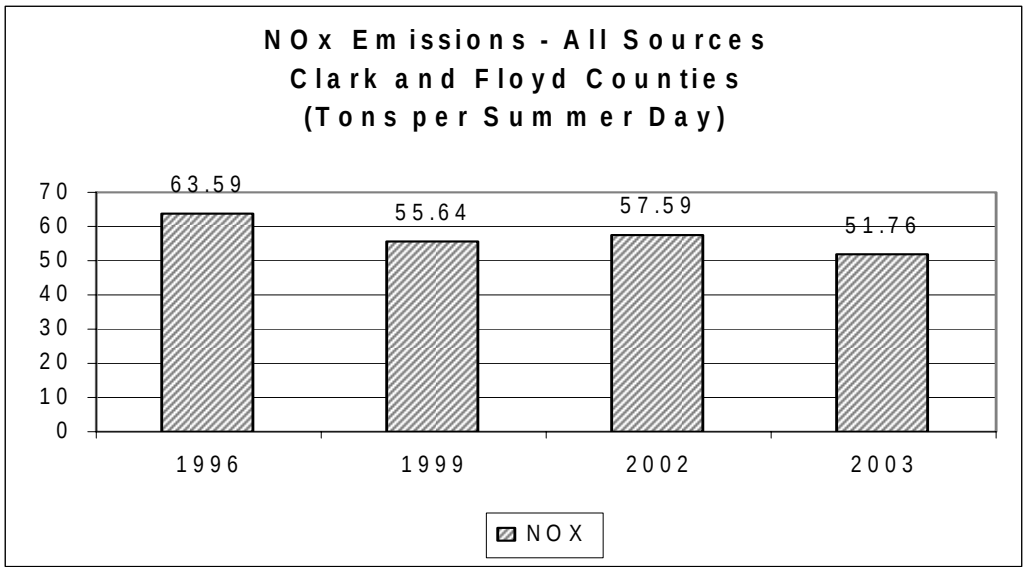
					1ST	2ND	3RD	4TH	2003-2005
SITE ID	COUNTY	ADDRESS	YEAR	%OBS	8-HR	8-HR	8-HR	8-HR	AVERAGE
21-029-0006	BULLITT	SHEPHERDSVILLE	2003	99	0.076	0.073	0.072	0.072	
21-029-0006	BULLITT	SHEPHERDSVILLE	2004	97	0.102	0.078	0.070	0.068	
21-029-0006	BULLITT	SHEPHERDSVILLE	2005	97	0.083	0.081	0.081	0.080	0.073
21-111-0027	JEFFERSON	[NOT IN A CITY]	2003	100	0.096	0.082	0.076	0.072	
21-111-0027	JEFFERSON	[NOT IN A CITY]	2004	98	0.093	0.071	0.071	0.070	
21-111-0027	JEFFERSON	[NOT IN A CITY]	2005	100	0.083	0.079	0.079	0.079	0.074
21-111-0051	JEFFERSON	LOUISVILLE	2003	100	0.084	0.081	0.079	0.075	
21-111-0051	JEFFERSON	LOUISVILLE	2004	96	0.073	0.071	0.071	0.070	
21-111-0051	JEFFERSON	LOUISVILLE	2005	100	0.091	0.086	0.086	0.085	0.077
21-111-1021	JEFFERSON	LOUISVILLE	2003	100	0.081	0.079	0.074	0.073	
21-111-1021	JEFFERSON	LOUISVILLE	2004	100	0.072	0.071	0.069	0.068	
21-111-1021	JEFFERSON	LOUISVILLE	2005	100	0.088	0.084	0.076	0.074	0.072
21-185-0004	OLDHAM	BUCKNER	2003	100	0.088	0.085	0.082	0.082	
21-185-0004	OLDHAM	BUCKNER	2004	99	0.078	0.077	0.076	0.076	
21-185-0004	OLDHAM	BUCKNER	2005	100	0.094	0.094	0.093	0.089	0.082

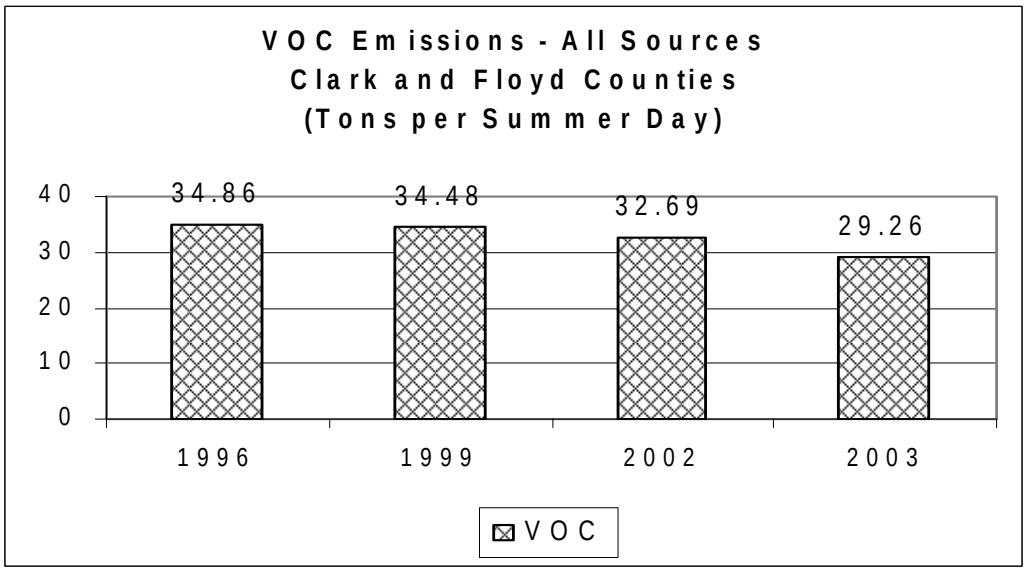


APPENDIX B

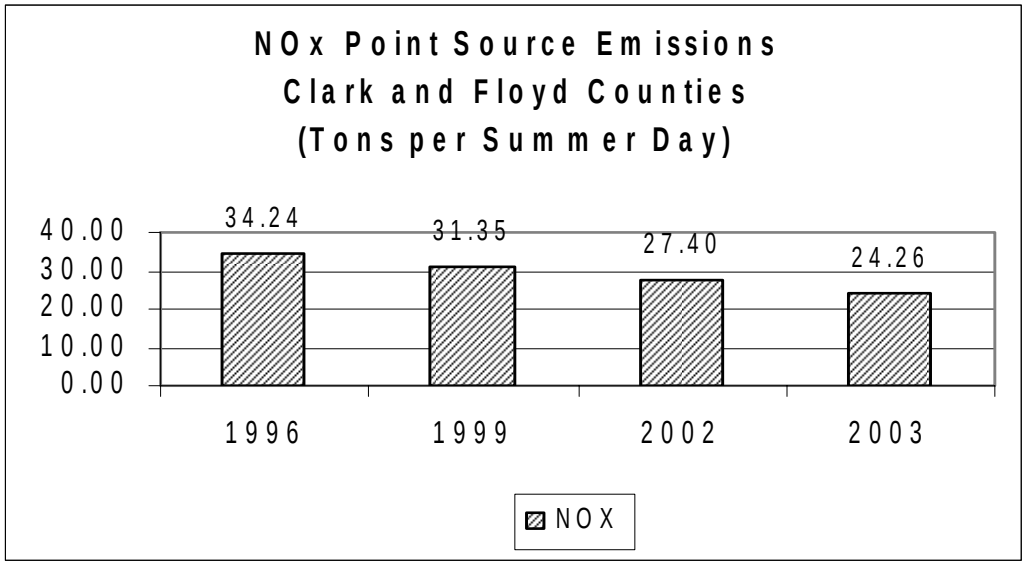
Emissions Inventories

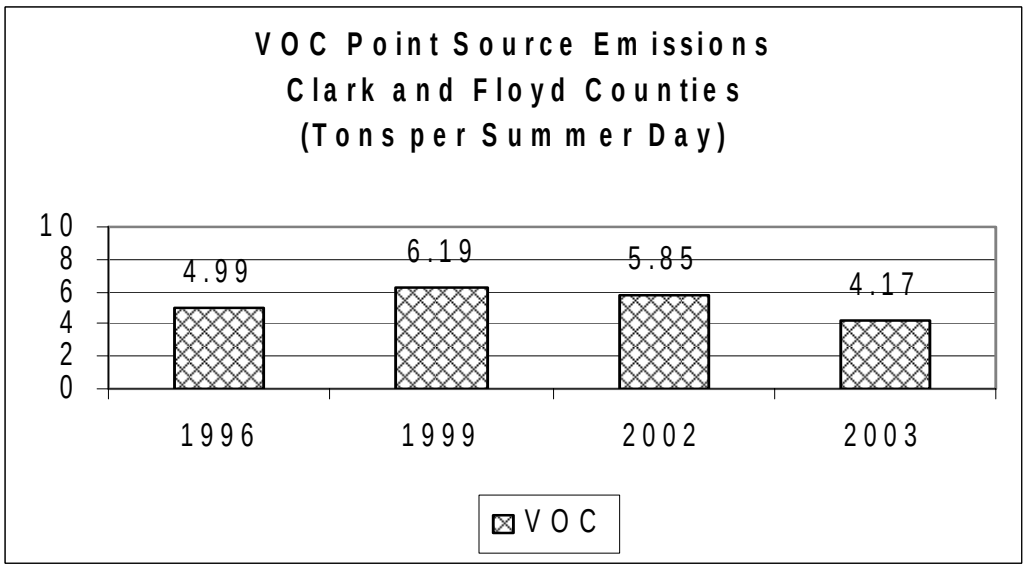
TOTAL - Clark and Floyd Counties		
Year	NOX	VOC
1996	63.59	34.86
1999	55.64	34.48
2002	57.59	32.69
2003	51.76	29.26



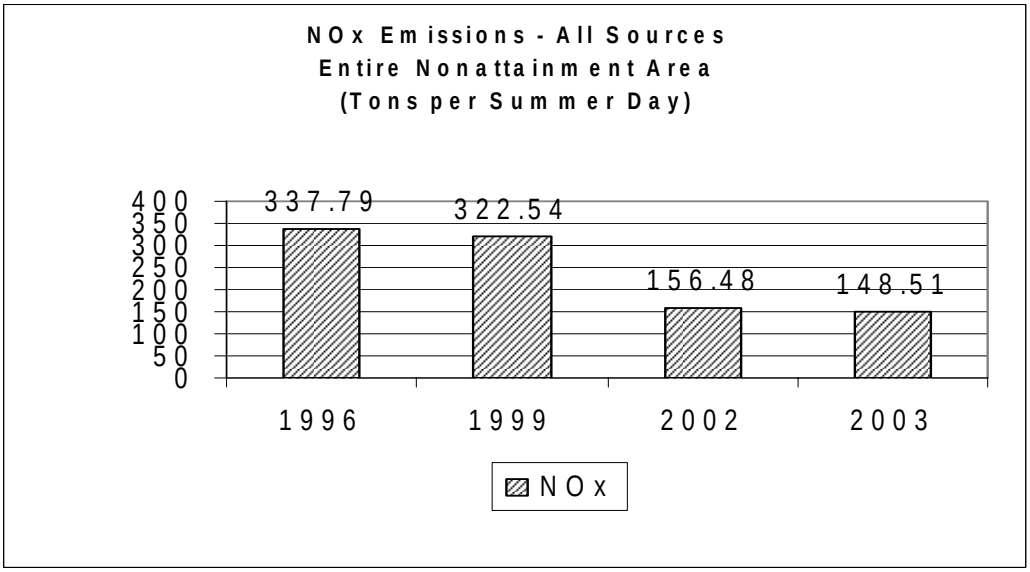


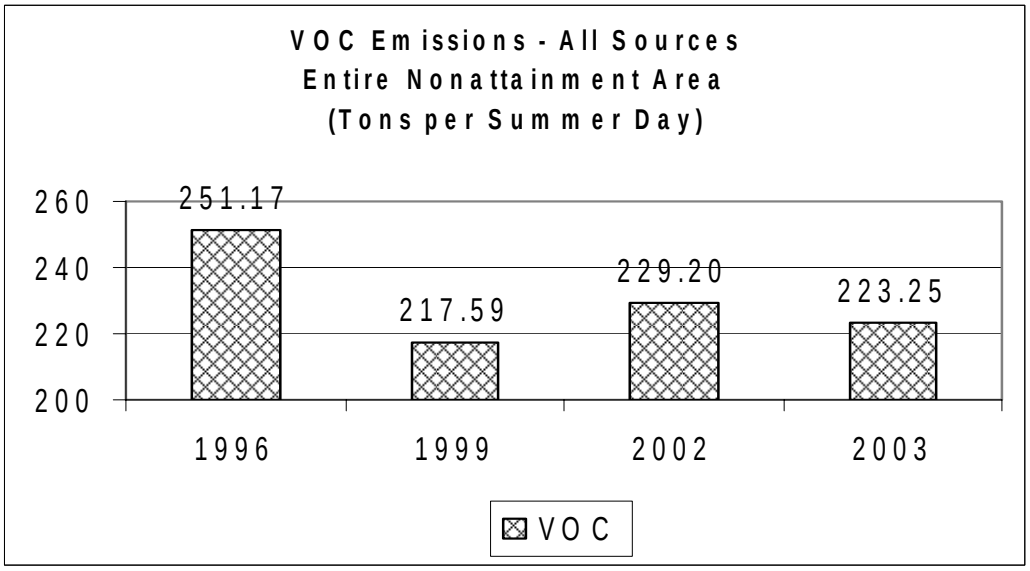
POINT - Clark and Floyd Counties		
Year	NOX	VOC
1996	34.24	4.99
1999	31.35	6.19
2002	27.40	5.85
2003	24.26	4.17



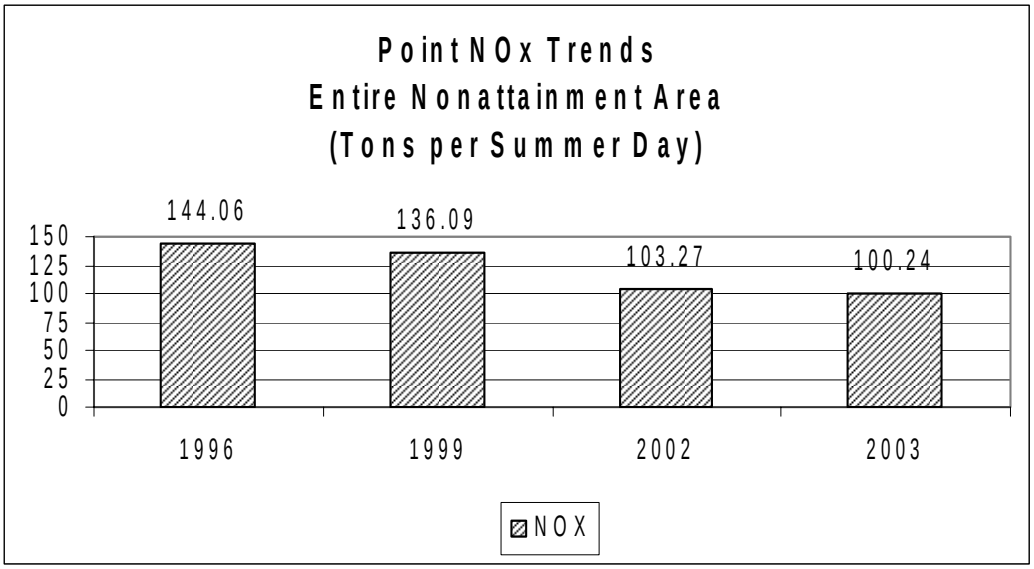


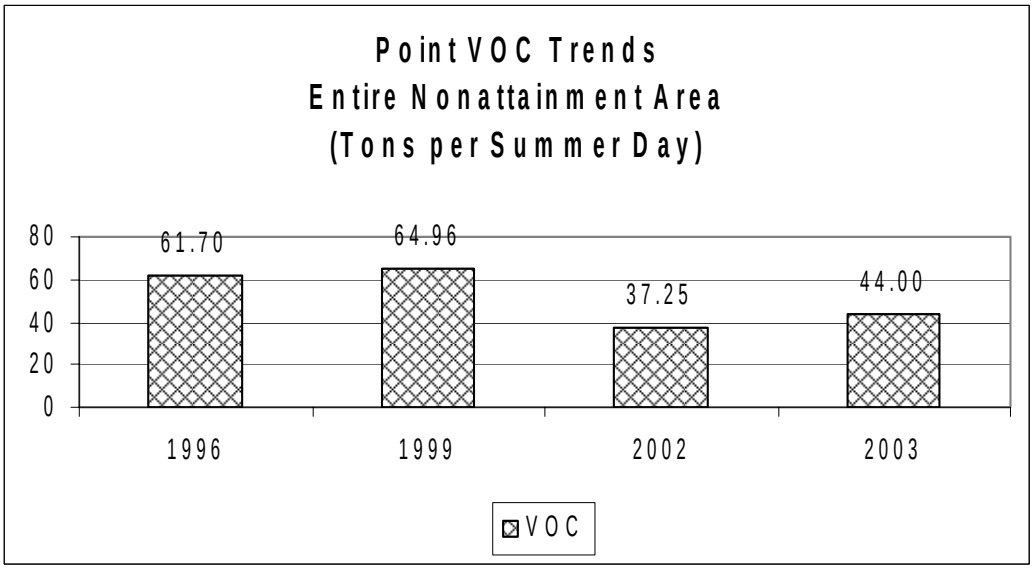
Entire Nonattainment Area		
Year	NOX	VOC
1996	337.79	251.17
1999	322.54	217.59
2002	156.48	229.20
2003	148.51	223.25





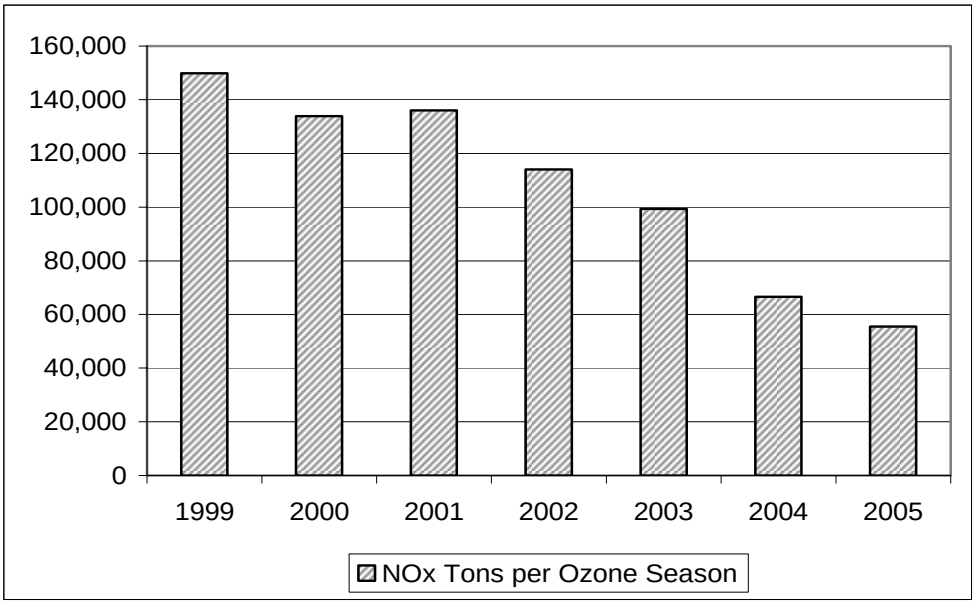
Point Trends -Entire Area		
Year	NOX	VOC
1996	144.06	61.70
1999	136.09	64.96
2002	103.27	37.25
2003	100.24	44.00





STATEWIDE EGU NOx TRENDS

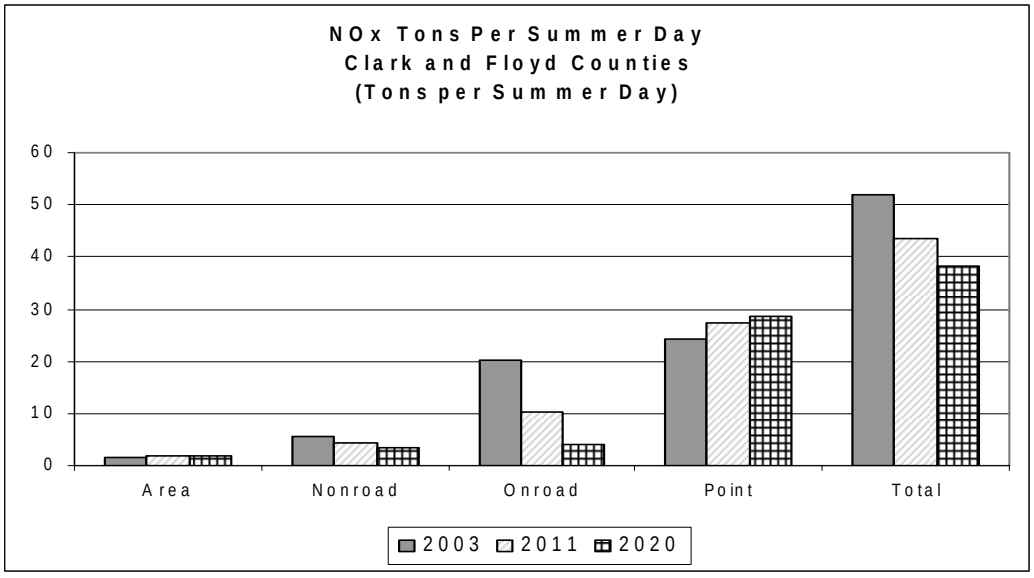
Year	NOx Tons per Ozone Season
1999	149,827
2000	133,881
2001	136,052
2002	113,996
2003	99,283
2004	66,568
2005	55,486

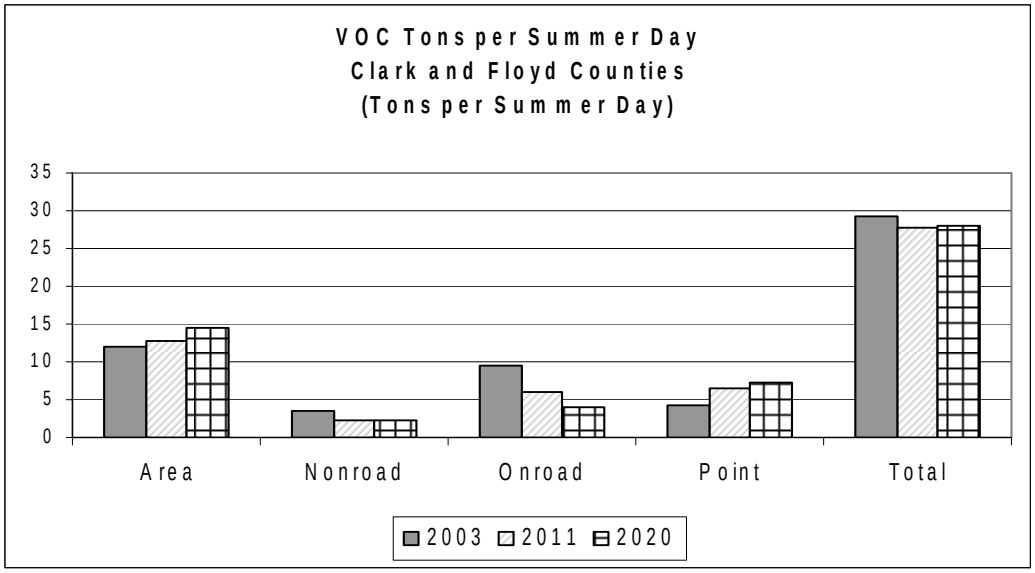


APPENDIX C

2011 and 2020 Projected Emissions Inventory
Clark and Floyd Counties

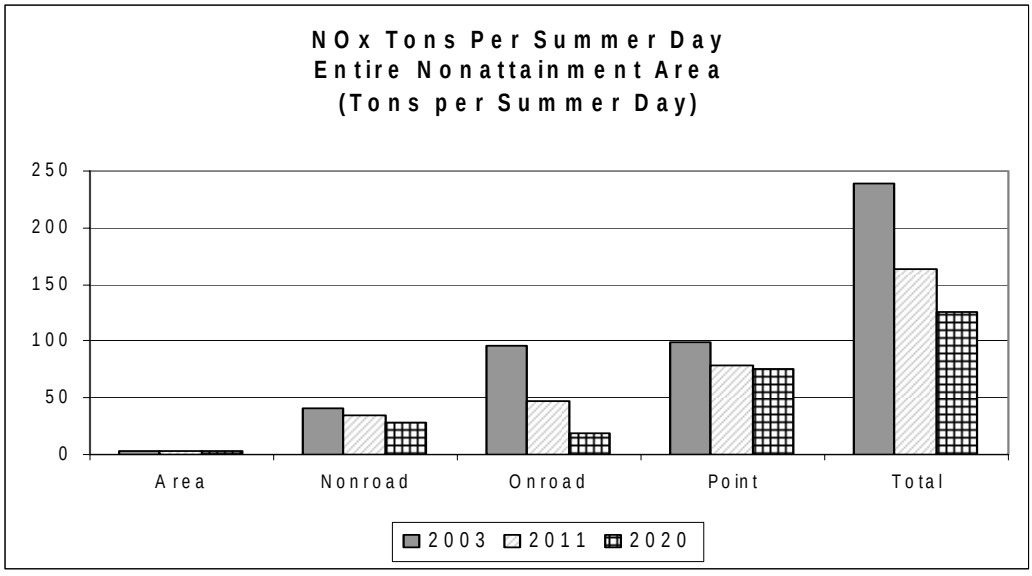
Sector	NOX 2003	NOX 2011	NOX 2020
Area	1.60	1.71	1.80
Non-road	5.63	4.43	3.49
On-road	20.27	10.20	4.15
Point	24.26	27.29	28.66
Total	51.77	43.63	38.10
Sector	**VOC 2003**	**VOC 2011**	**VOC 2020**
Area	11.94	12.77	14.59
Non-road	3.55	2.35	2.20
On-Road	9.60	6.12	3.98
Point	4.17	6.61	7.14
Total	29.26	27.85	27.91

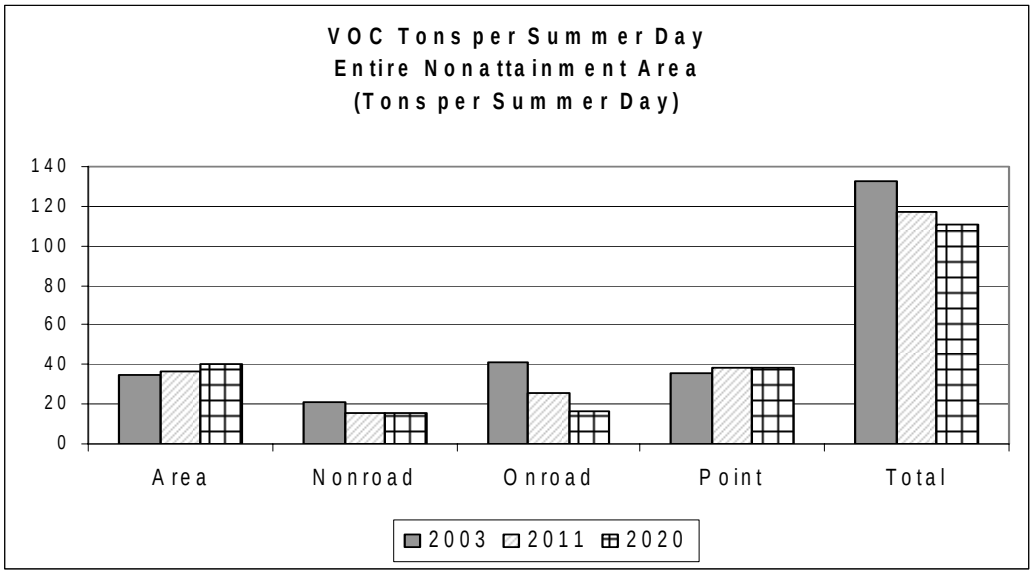



VOC Tons per Summer Day
Clark and Floyd Counties
(Tons per Summer Day)
35
30
25
20
15
10
5
0
Area
Nonroad
Onroad
Point
Total
2003
2011
2020

2011 and 2020 Projected Emissions Inventory
Entire Nonattainment Area

Sector	NOX 2003	NOX 2011	NOX 2020
Area	2.54	2.66	2.80
Non-road	41.00	34.77	27.88
On -road	95.51	47.53	19.62
Point	99.71	78.93	75.95
Total	238.77	163.89	126.25
Sector	**VOC 2003**	**VOC 2011**	**VOC 2020**
Area	35.07	36.93	40.01
Non-road	21.17	15.87	15.26
On -road	40.97	25.69	16.89
Point	35.90	38.30	38.81
Total	133.11	116.80	110.97




VOC Tons per Summer Day
Entire Nonattainment Area
(Tons per Summer Day)
140
120
100
80
60
40
20
0
Area
Nonroad
Onroad
Point
Total
2003
2011
2020

APPENDIX D

Public Participation Documentation

Summary of and Response to Comments Received

Legend

- Comment
  - IDEM's Response

Jeff Kling, Duke Energy Indiana, Gallagher Station

- Duke Energy Indiana strongly supports the Clark and Floyd County ozone redesignation request.
  - No comment necessary.

APPENDIX E

Mobile Input/Output Calculation Files
Clark and Floyd Counties, Indiana

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Vehicle Miles Traveled (VMT)

Louisville Metro APCD **01/31/2006 GLF**

KIPDAVMT_Jan_2006_summer.XLS

From new VMT data provided by KIPDA 09/22/2005 and 01/27/2006.

(Raw data pages adapted to new format of NETEBOUT.yyA KIPDA files)

Summer Daily VMT from KIPDA Travel Demand Model, adjusted to HPMS (2000 base year)

Bullitt, KY	*1999*	*2195902*	Jefferson, KY	*1999*	*21980490*
	2002	2330708		2002	20433203
	2003	2398169		2003	20691774
	2009	2848714		2009	22345601
	2012	3079053		2012	23044370
	2020	3682127		2020	24739314
	2030	4448245		2030	27262669
Clark, IN	*1999*	*3994580*	Oldham, KY	*1999*	*1349429*
	2002	3909739		2002	1382441
	2003	3979739		2003	1417884
	2009	4548497		2009	1645793
	2012	4773077		2012	1769263
	2020	5489054		2020	2135071
	2030	6329459		2030	2569829
Floyd, IN	*1999*	*2376049*			
	2002	2604741			
	2003	2637975			
	2009	2957904			
	2012	3212334			
	2020	3529747			
	2030	4103313			

Emission Factors 1

2003	MOBILE6	Summer	Overall	Factors	Composites forr	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.291	17.895	3.165		0.97	14.089	2.961
2003	MOBILE6	Summer	Overall	Factors	Composites for	Clark	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.3	16.121	2.804		0.987	12.3	2.595
2003	MOBILE6	Summer	Overall	Factors	Composites for	Floyd	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.341	16.043	2.741		1.027	12.2	2.532
2003	MOBILE6	Summer	Overall	Factors	Composites for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.111	13.658	2.775		0.837	10.486	2.579
2003	MOBILE6	Summer	Overall	Factors	Composites for	Oldham	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.27	16.723	3.03		0.954	13.029	2.828
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.048	14.079	2.612		0.82	11.189	2.454
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.045	12.211	2.294		0.826	9.317	2.135
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.077	12.107	2.244		0.858	9.204	2.084
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Jeffers	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.984	12.149	2.347		0.767	9.504	2.189
2005	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.041	13.384	2.512		0.816	10.56	2.353
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.835	10.644	1.884		0.66	8.311	1.761
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.887	10.139	1.725		0.704	7.712	1.597
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.911	10.056	1.686		0.727	7.62	1.558
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.79	9.332	1.708		0.623	7.173	1.586
2008	MOBILE6	Summer	Overall	Factors	NO VET Composites	Oldham	KY

					for		
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.831	10.132	1.808		0.658	7.85	1.686
					NO VET Composites		
2011	MOBILE6	Summer	Overall	Factors	for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.655	8.885	1.284		0.515	6.927	1.185
					NO VET Composites		
2011	MOBILE6	Summer	Overall	Factors	for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.696	8.454	1.19		0.55	6.448	1.087
					NO VET Composites		
2011	MOBILE6	Summer	Overall	Factors	for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.731	8.405	1.171		0.585	6.391	1.068
					NO VET Composites		
2011	MOBILE6	Summer	Overall	Factors	for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.616	7.832	1.178		0.483	6.006	1.079
					NO VET Composites		
2011	MOBILE6	Summer	Overall	Factors	for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.642	8.462	1.23		0.505	6.543	1.132
					NO VET Composites		
2014	MOBILE6	Summer	Overall	Factors	for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.501	7.656	0.824		0.387	5.922	0.743
					NO VET Composites		
2014	MOBILE6	Summer	Overall	Factors	for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.535	7.25	0.776		0.414	5.5	0.692
					NO VET Composites		
2014	MOBILE6	Summer	Overall	Factors	for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.561	7.217	0.767		0.44	5.46	0.683
					NO VET Composites		
2014	MOBILE6	Summer	Overall	Factors	for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.473	6.741	0.764		0.363	5.121	0.683
					NO VET Composites		
2014	MOBILE6	Summer	Overall	Factors	for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.492	7.288	0.794		0.379	5.588	0.713
					NO VET Composites		
2017	MOBILE6	Summer	Overall	Factors	for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.421	6.921	0.552		0.322	5.305	0.487
					NO VET Composites		
2017	MOBILE6	Summer	Overall	Factors	for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.443	6.626	0.538		0.339	5.005	0.469
					NO VET Composites		
2017	MOBILE6	Summer	Overall	Factors	for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.475	6.608	0.531		0.37	4.978	0.463
2017	MOBILE6	Summer	Overall	Factors	NO VET Composites	Jefferson	KY

					for		
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.396	6.13	0.522		0.301	4.618	0.458
					NO VET Composites		
2017	MOBILE6	Summer	Overall	Factors	for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.411	6.565	0.533		0.313	4.981	0.468

Emission Factors 2

2002	MOBILE6	Summer	Overall	Factors	Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.378	19.139	3.345		1.031	15.009	3.126
2002	MOBILE6	Summer	Overall	Factors	Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.389	17.188	2.954		1.049	12.968	2.731
2002	MOBILE6	Summer	Overall	Factors	Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.431	17.183	2.891		1.09	12.939	2.667
2002	MOBILE6	Summer	Overall	Factors	Composites for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.191	14.877	2.945		0.889	11.334	2.733
2002	MOBILE6	Summer	Overall	Factors	Composites for	Oldham	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	1.356	18.027	3.218		1.014	13.98	3.001
2009	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.772	10.02	1.672		0.61	7.818	1.559
2009	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.823	9.548	1.538		0.653	7.263	1.419
2009	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.844	9.47	1.506		0.673	7.176	1.387
2009	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.731	8.787	1.521		0.576	6.746	1.407
2009	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.768	9.541	1.607		0.608	7.386	1.494
2012	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.595	8.383	1.095		0.466	6.526	1.001
2012	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.633	7.954	1.022		0.498	6.063	0.923
2012	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.663	7.91	1.007		0.529	6.012	0.908
2012	MOBILE6	Summer	Overall	Factors	NO VET Composites for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.559	7.389	1.008		0.436	5.655	0.915
2012	MOBILE6	Summer	Overall	Factors	NO VET Composites	Oldham,	KY

					for		
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.583	7.983	1.051		0.456	6.163	0.958
					NO VET Composites		
2020	MOBILE6	Summer	Overall	Factors	for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.37	6.52	0.424		0.279	4.99	0.37
					NO VET Composites		
2020	MOBILE6	Summer	Overall	Factors	for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.389	6.227	0.419		0.293	4.7	0.362
					NO VET Composites		
2020	MOBILE6	Summer	Overall	Factors	for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.418	6.217	0.415		0.322	4.681	0.358
					NO VET Composites		
2020	MOBILE6	Summer	Overall	Factors	for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.349	5.774	0.404		0.262	4.34	0.35
					NO VET Composites		
2020	MOBILE6	Summer	Overall	Factors	for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.362	6.183	0.411		0.273	4.683	0.357
					NO VET Composites		
2030	MOBILE6	Summer	Overall	Factors	for	Bullitt	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.329	6.206	0.326		0.247	4.738	0.283
					NO VET Composites		
2030	MOBILE6	Summer	Overall	Factors	for	Clark,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.343	5.957	0.328		0.259	4.499	0.283
					NO VET Composites		
2030	MOBILE6	Summer	Overall	Factors	for	Floyd,	IN
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.382	6.039	0.329		0.297	4.572	0.284
					NO VET Composites		
2030	MOBILE6	Summer	Overall	Factors	for	Jefferson	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.307	5.535	0.316		0.229	4.156	0.273
					NO VET Composites		
2030	MOBILE6	Summer	Overall	Factors	for	Oldham,	KY
MPH	VOC	CO	NOX		NONSTART: VOC	CO	NOX
ALL	0.317	5.859	0.317		0.237	4.421	0.274

KIPDA Mobile Data

Louisville Metro APCD

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NOx TPSD
Bullitt, KY	2002	2330708	1.378	19.139	3.345	3212	44607	7796	3.54	49.17	8.59
Clark, IN	2002	3909739	1.389	17.188	2.954	5431	67201	11549	5.99	74.07	12.73
Floyd, IN	2002	2604741	1.431	17.183	2.891	3727	44757	7530	4.11	49.34	8.30
Jefferson, KY	2002	20433203	1.191	14.877	2.945	24336	303985	60176	26.83	335.08	66.33
Oldham, KY	2002	1382441	1.356	18.027	3.218	1875	24921	4449	2.07	27.47	4.90
5-County Area	2002	30660832	1.258	15.834	2.984	38580	485471	91500	**42.53**	535.13	**100.86**
1-hr NAA	2002	28588370				35739	446569	84655	39.40	492.25	93.31
New 8-hr "ring"	2002	2072462				2841	38902	6845	**3.13**	42.88	**7.55**
Bullitt, KY	2003	2398169	1.291	17.895	3.165	3096	42915	7590	3.41	47.31	8.37
Clark, IN	2003	3979739	1.300	16.121	2.804	5174	64157	11159	5.70	70.72	12.30
Floyd, IN	2003	2637975	1.341	16.043	2.741	3538	42321	7231	3.90	46.65	7.97
Jefferson, KY	2003	20691774	1.111	13.658	2.775	22989	282608	57420	25.34	311.52	63.29
Oldham, KY	2003	1417884	1.270	16.723	3.030	1801	23711	4296	1.98	26.14	4.74
5-County Area	2003	31125541	1.176	14.641	2.817	36596	455713	87696	**40.34**	502.33	**96.67**
1-hr NAA	2003	28995360				33861	418418	81049	37.32	461.22	89.34
New 8-hr "ring"	2003	2130181				2735	37295	6647	**3.02**	41.11	**7.33**
Bullitt, KY	2005	*2548351*	1.048	14.079	2.612	2671	35878	6656	2.94	39.55	7.34
Clark, IN	2005	*4169325*	1.045	12.211	2.294	4357	50912	9564	4.80	56.12	10.54
Floyd, IN	2005	*2744618*	1.077	12.107	2.244	2956	33229	6159	3.26	36.63	6.79
Jefferson, KY	2005	*21243050*	0.984	12.149	2.347	20903	258082	49857	23.04	284.48	54.96
Oldham, KY	2005	*1493854*	1.041	13.384	2.512	1555	19994	3753	1.71	22.04	4.14
5-County Area	2005	*32199197*				32442	398094	75990	**35.76**	438.82	**83.76**
1-hr NAA	2005	*29941977*				30081	366830	70168	33.16	404.35	77.35
New 8-hr "ring"	2005	*2257220*				2360	31264	5822	**2.60**	34.46	**6.42**

Note: Italicized VMT estimates above are interpolated -- others are directly from KIPDA travel demand model

Louisville Metro APCD

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NOx TPSD
Bullitt, KY	2008	*2773623*	0.835	10.644	1.884	2316	29522	5226	2.55	32.54	5.76
Clark, IN	2008	*4453704*	0.887	10.139	1.725	3950	45156	7683	4.35	49.78	8.47
Floyd, IN	2008	*2904583*	0.911	10.056	1.686	2646	29208	4897	2.92	32.20	5.40
Jefferson, KY	2008	*22069963*	0.790	9.332	1.708	17435	205957	37695	19.22	227.02	41.55
Oldham, KY	2008	*1607808*	0.831	10.132	1.808	1336	16290	2907	1.47	17.96	3.20
5-County Area	2008	*33809681*				27684	326134	58408	**30.52**	359.50	**64.38**
1-hr NAA	2008	*31361902*				25643	300488	53857	28.27	331.23	59.37
New 8-hr "ring"	2008	*2447779*				2041	25646	4551	**2.25**	28.27	**5.02**
Bullitt, KY	2009	2848714	0.772	10.020	1.672	2199	28544	4763	2.42	31.46	5.25
Clark, IN	2009	4548497	0.823	9.548	1.538	3743	43429	6996	4.13	47.87	7.71
Floyd, IN	2009	2957904	0.844	9.470	1.506	2496	28011	4455	2.75	30.88	4.91
Jefferson, KY	2009	22345601	0.731	8.787	1.521	16335	196351	33988	18.01	216.44	37.46
Oldham, KY	2009	1645793	0.768	9.541	1.607	1264	15703	2645	1.39	17.31	2.92
5-County Area	2009	34346509	0.758	9.085	1.539	26038	312038	52846	**28.70**	343.96	**58.25**
1-hr NAA	2009	31835211				24102	287266	48700	26.57	316.65	53.68
New 8-hr "ring"	2009	2511298				1935	24772	4146	**2.13**	27.31	**4.57**
Bullitt, KY	2011	*3002273*	0.655	8.885	1.284	1966	26675	3855	2.17	29.40	4.25
Clark, IN	2011	*4698217*	0.696	8.454	1.190	3270	39719	5591	3.60	43.78	6.16
Floyd, IN	2011	*3127524*	0.731	8.405	1.171	2286	26287	3662	2.52	28.98	4.04
Jefferson, KY	2011	*22811447*	0.616	7.832	1.178	14052	178659	26872	15.49	196.93	29.62
Oldham, KY	2011	*1728106*	0.642	8.462	1.230	1109	14623	2126	1.22	16.12	2.34
5-County Area	2011	*35367568*				22684	285963	42106	**25.00**	315.22	**46.41**
1-hr NAA	2011	*32724074*				20964	262838	38758	23.11	289.72	42.72
New 8-hr "ring"	2011	*2643493*				1720	23125	3348	**1.90**	25.49	**3.69**

Note: Italicized VMT estimates above are interpolated -- others are directly from KIPDA travel demand model

Louisville Metro APCD

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NOx TPSD
Bullitt, KY	2012	3079053	0.595	8.383	1.095	1832	25812	3372	2.02	28.45	3.72
Clark, IN	2012	4773077	0.633	7.954	1.022	3021	37965	4878	3.33	41.85	5.38
Floyd, IN	2012	3212334	0.663	7.910	1.007	2130	25410	3235	2.35	28.01	3.57
Jefferson, KY	2012	23044370	0.559	7.389	1.008	12882	170275	23229	14.20	187.69	25.60
Oldham, KY	2012	1769263	0.583	7.983	1.051	1031	14124	1859	1.14	15.57	2.05
5-County Area	2012	35878097	0.582	7.625	1.019	20896	273585	36573	**23.03**	301.57	**40.31**
1-hr NAA	2012	33168506				19295	251222	33644	21.27	276.92	37.09
New 8-hr "ring"	2012	2709591				1602	22363	2928	**1.77**	24.65	**3.23**
Bullitt, KY	2014	*3229822*	0.501	7.656	0.824	1618	24728	2661	1.78	27.26	2.93
Clark, IN	2014	*4952071*	0.535	7.250	0.776	2649	35903	3843	2.92	39.58	4.24
Floyd, IN	2014	*3291687*	0.561	7.217	0.767	1847	23756	2525	2.04	26.19	2.78
Jefferson, KY	2014	*23468106*	0.473	6.741	0.764	11100	158199	17930	12.24	174.38	19.76
Oldham, KY	2014	*1860715*	0.492	7.288	0.794	915	13561	1477	1.01	14.95	1.63
5-County Area	2014	*36802401*				18130	256146	28436	**19.98**	282.35	**31.34**
1-hr NAA	2014	*33957743*				16713	234706	26120	18.42	258.72	28.79
New 8-hr "ring"	2014	*2844658*				1417	21439	2316	**1.56**	23.63	**2.55**
Bullitt, KY	2017	*3455974*	0.421	6.921	0.552	1455	23919	1908	1.60	26.37	2.10
Clark, IN	2017	*5220563*	0.443	6.626	0.538	2313	34591	2809	2.55	38.13	3.10
Floyd, IN	2017	*3410717*	0.475	6.608	0.531	1620	22538	1811	1.79	24.84	2.00
Jefferson, KY	2017	*24103710*	0.396	6.130	0.522	9545	147756	12582	10.52	162.87	13.87
Oldham, KY	2017	*1997893*	0.411	6.565	0.533	821	13116	1065	0.91	14.46	1.17
5-County Area	2017	*38188857*				15754	241920	20174	**17.37**	266.67	**22.24**
1-hr NAA	2017	*35141597*				14481	221183	18511	15.96	243.81	20.40
New 8-hr "ring"	2017	*3047260*				1273	20737	1663	**1.40**	22.86	**1.83**

Note: Italicized VMT estimates above are interpolated -- others are directly from KIPDA travel demand model

Louisville Metro APCD

County	VMT from KIPDA TDM Current Jan 2006		MOBILE6 Emission Factors From APCD suite 62SIP_D7			County Emissions					
	Year	KIPDA VMT/day	VOC g/mi	CO g/mi	NOx g/mi	VOC kg/day	CO kg/day	NOx kg/day	VOC TPSD	CO TPSD	NOx TPSD
Bullitt, KY	2020	3682127	0.370	6.520	0.424	1362	24007	1561	1.50	26.46	1.72
Clark, IN	2020	5489054	0.389	6.227	0.419	2135	34180	2300	2.35	37.68	2.54
Floyd, IN	2020	3529747	0.418	6.217	0.415	1475	21944	1465	1.63	24.19	1.61
Jefferson, KY	2020	24739314	0.349	5.774	0.404	8634	142845	9995	9.52	157.46	11.02
Oldham, KY	2020	2135071	0.362	6.183	0.411	773	13201	878	0.85	14.55	0.97
5-County Area	2020	39575313	0.363	5.968	0.409	14380	236178	16198	**15.85**	260.34	**17.86**
1-hr NAA	2020	36325452				13186	215346	14834	14.53	237.37	16.35
New 8-hr "ring"	2020	3249861				1194	20832	1364	**1.32**	22.96	**1.50**
Bullitt, KY	2030	4448245	0.329	6.206	0.326	1463	27606	1450	1.61	30.43	1.60
Clark, IN	2030	6329459	0.343	5.957	0.328	2171	37705	2076	2.39	41.56	2.29
Floyd, IN	2030	4103313	0.382	6.039	0.329	1567	24780	1350	1.73	27.31	1.49
Jefferson, KY	2030	27262669	0.307	5.535	0.316	8370	150899	8615	9.23	166.33	9.50
Oldham, KY	2030	2569829	0.317	5.859	0.317	815	15057	815	0.90	16.60	0.90
5-County Area	2030	44713515	0.322	5.726	0.320	14386	256046	14306	**15.86**	282.24	**15.77**
1-hr NAA	2030	40792174				13111	232152	13039	14.45	255.90	14.37
New 8-hr "ring"	2030	3921341				1275	23894	1267	**1.41**	26.34	**1.40**

Note: Italicized VMT estimates above are interpolated -- others are directly from KIPDA travel demand model

Jefferson County

02/27/2006

Louisville Metro APCD **GLF/DSF**

Summary of Projected Summer Emission Inventories for Jefferson County, KY

Tons per Summer Day Emissions

VOC	**2003**	**2005**	**2008**	**2011**	**2014**	**2017**	**2020**
Onroad Mobile	25.34	23.04	19.22	15.49	12.24	10.52	9.52
Nonroad Mobile	14.31	13.14	11.50	10.62	10.41	10.45	10.64
Point Sources	23.63	23.42	23.33	23.11	22.93	22.74	22.51
Nonpoint Sources	17.33	17.41	17.51	17.59	17.67	17.76	17.85
Total All Sources	80.61	77.01	71.56	66.81	63.25	61.47	60.51

NOx	**2003**	**2005**	**2008**	**2011**	**2014**	**2017**	**2020**
Onroad Mobile	63.29	54.96	41.55	29.62	19.76	13.87	11.02
Nonroad Mobile	31.94	31.11	29.36	27.37	25.26	23.44	22.17
Point Sources	74.78	53.95	53.63	50.91	51.76	51.24	46.49
Nonpoint Sources	0.75	0.76	0.76	0.76	0.76	0.76	0.76
Total All Sources	170.76	140.77	125.30	108.66	97.54	89.31	80.45

Kentucky Department for Air Quality Data

DRAFT MARCH 24, 2006

LOUISVILLE REDESIGNATION REQUEST EMISSIONS AND PROJECTION SUMMARY: 2002, 2003, 2005, 2008, 2011, 2014, 2017, AND 2020

Bullitt and Oldham Counties

Note: All emissions reflect any applicable Federal or State controls.

POINT SOURCE EMISSIONS (in tons per day)

	2002 Baseyear			2003 Attainment			2005 Projected			2008 Projected			2011 Projected			2014 Projected			2017 Projected			2020 Projected		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	7.78	0.17	0.56	8.10	0.20	0.60	8.21	0.20	0.61	8.39	0.21	0.64	8.58	0.21	0.65	8.77	0.23	0.68	8.95	0.24	0.71	9.16	0.24	0.72
Oldham	0.55	0.01	0.01	0.00	0.05	0.07	0.00	0.05	0.07	0.00	0.05	0.07	0.00	0.05	0.08	0.00	0.06	0.08	0.00	0.06	0.08	0.00	0.06	0.08
VOC	**8.33**			**8.10**			**8.21**			**8.39**			**8.58**			**8.77**			**8.95**			**9.16**		
CO		**0.18**			**0.25**			**0.25**			**0.26**			**0.26**			**0.29**			**0.30**			**0.30**	
NOx			**0.57**			**0.67**			**0.68**			**0.71**			**0.73**			**0.76**			**0.79**			**0.80**

AREA SOURCE EMISSIONS (in tons per day)

	2002 Baseyear			2003 Attainment			2005 Projected			2008 Projected			2011 Projected			2014 Projected			2017 Projected			2020 Projected		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	3.31	1.31	0.11	3.34	1.36	0.11	3.43	1.41	0.11	3.60	1.48	0.12	3.75	1.53	0.12	3.92	1.59	0.13	4.09	1.66	0.13	4.26	1.74	0.14
Oldham	2.40	0.89	0.07	2.46	0.90	0.07	2.55	0.94	0.07	2.70	0.97	0.07	2.82	1.01	0.07	3.01	1.05	0.09	3.16	1.10	0.09	3.32	1.15	0.09
VOC	**5.71**			**5.80**			**5.98**			**6.30**			**6.57**			**6.93**			**7.25**			**7.58**		
CO		**2.20**			**2.26**			**2.35**			**2.45**			**2.54**			**2.64**			**2.76**			**2.89**	
NOx			**0.18**			**0.18**			**0.18**			**0.19**			**0.19**			**0.22**			**0.22**			**0.23**

HIGHWAY MOBILE SOURCE EMISSIONS (in tons per day)

	2002 Baseyear			2003 Attainment			2005 Projected			2008 Projected			2011 Projected			2014 Projected			2017 Projected			2020 Projected		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	3.69	45.82	7.48	3.74	45.64	7.52	3.43	40.37	7.23	2.87	33.54	5.99	2.52	30.66	4.83	2.30	29.80	3.84	2.18	30.18	3.17	2.05	31.18	2.73
Oldham	2.22	26.68	4.36	2.29	26.93	4.43	2.16	24.58	4.36	1.79	20.23	3.58	1.56	18.47	2.88	1.45	18.23	2.34	1.40	18.70	1.96	1.34	19.55	1.72
VOC	**5.91**			**6.03**			**5.59**			**4.66**			**4.08**			**3.75**			**3.58**			**3.39**		
CO		**72.50**			**72.57**			**64.95**			**53.77**			**49.13**			**48.03**			**48.88**			**50.73**	
NOx			**11.84**			**11.95**			**11.59**			**9.57**			**7.71**			**6.18**			**5.13**			**4.45**

NON-HIGHWAY SOURCE EMISSIONS (in tons per day)

	2002 Baseyear			2003 Attainment			2005 Projected			2008 Projected			2011 Projected			2014 Projected			2017 Projected			2020 Projected		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	1.68	11.67	1.81	1.77	12.06	1.81	1.91	12.81	1.78	1.91	13.63	1.70	1.82	14.25	1.60	1.68	14.63	1.47	1.48	14.96	1.35	1.35	15.36	1.27
Oldham	1.58	16.56	1.63	1.54	16.92	1.63	1.38	17.46	1.59	1.18	18.10	1.49	1.08	18.74	1.37	1.05	19.38	1.22	1.05	20.11	1.07	1.07	20.90	0.95
VOC	**3.26**			**3.31**			**3.29**			**3.09**			**2.90**			**2.73**			**2.53**			**2.42**		
CO		**28.23**			**28.98**			**30.27**			**31.73**			**32.99**			**34.01**			**35.07**			**36.26**	
NOx			**3.44**			**3.44**			**3.37**			**3.19**			**2.97**			**2.69**			**2.42**			**2.22**

TOTAL EMISSIONS (in tons per day)

	2002 Baseyear			2003 Attainment			2005 Projected			2008 Projected			2011 Projected			2014 Projected			2017 Projected			2020 Projected		
	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx	VOC	CO	NOx
Bullitt	16.46	58.97	9.96	16.95	59.26	10.04	16.98	54.79	9.73	16.77	48.86	8.45	16.67	46.65	7.20	16.67	46.25	6.12	16.70	47.04	5.36	16.82	48.52	4.86
Oldham	6.75	44.14	6.07	6.29	44.80	6.20	6.09	43.03	6.09	5.67	39.35	5.21	5.46	38.27	4.40	5.51	38.72	3.73	5.61	39.97	3.20	5.73	41.66	2.84
VOC	**23.21**			**23.24**			**23.07**			**22.44**			**22.13**			**22.18**			**22.31**			**22.55**		
CO		**103.11**			**104.06**			**97.82**			**88.21**			**84.92**			**84.97**			**87.01**			**90.18**	
NOx			**16.03**			**16.24**			**15.82**			**13.66**			**11.60**			**9.85**			**8.56**			**7.70**

Note: Biogenic emission totals not included in this summary.

IDEM Mobile Calculations

On-road mobile emissions

VOC emissions (tons/summer day)	2003	2011	2020
Clark, IN	5.70	3.60	2.35
Floyd, IN	3.90	2.52	1.63
Jefferson, KY	25.34	15.49	9.52
Bullitt, KY	3.74	2.52	2.05
Oldham, KY	2.29	1.56	1.34
Total	40.97	25.69	16.89
IN subtotal	9.60	6.12	3.98
Ky subtotal	31.37	19.57	12.91

NOx emissions (tons/summer day)	2003	2011	2020
Clark, IN	12.30	6.16	2.54
Floyd, IN	7.97	4.04	1.61
Jefferson, KY	63.29	29.62	11.02
Bullitt, KY	7.52	4.83	2.73
Oldham, KY	4.43	2.88	1.72
Total	95.51	47.53	19.62
IN subtotal	20.27	10.20	4.15
Ky subtotal	75.24	37.33	15.47

Bullitt and Oldham emissions provided by KDAQ
Clark, Floyd and Jefferson emissions provided by KIPDA

(1) "Normal" using APCD/KIPDA and KYDAQ/KYTC procedures
(2) "Normal" using only APCD/KIPDA procedures
(3) "NoBuild" -- Approach 1 using modified APCD/KIPDA procedures
(4) "NoBuild" -- Approach 2 using modified APCD/KIPDA procedures

Louisville Area	2003	2011	2020
VOC (tons/day)	40.97	25.69	16.89
NOx (tons/day)	95.51	47.53	19.62
Clark&Floyd subtotal			
VOC (tons/day)	9.60	6.12	3.98
NOx (tons/day)	20.27	10.20	4.15
Clark&Floyd subtotal %			
VOC (tons/day)	23.4%	23.8%	23.6%
NOx (tons/day)	21.2%	21.5%	21.2%

Clark/Floyd County and Entire Nonattainment Area Working Emissions

2003

COUNTY_NAM	Category	NOx	VOC
Clark County	Area	0.87	6.98
	Nonroad	3.46	2.07
	Onroad	12.30	5.70
	Point	7.01	5.53
Floyd County	Area	0.73	4.96
	Nonroad	2.17	1.48
	Onroad	7.97	3.90
	Point*	17.13	0.85
TOTAL		**51.64**	**31.47**

POINT totals include EGUs
No EGUs in Clark County; only Floyd County

2011

COUNTY_NAM	Category	NOx	VOC
Clark County	Area	0.93	7.38
	Nonroad	2.83	1.47
	Onroad	6.16	3.60
	Point	7.25	5.64
Floyd County	Area	0.78	5.39
	Nonroad	1.60	0.88
	Onroad	4.04	2.52
	Point*	20.04	0.97
TOTAL		**43.63**	**27.85**

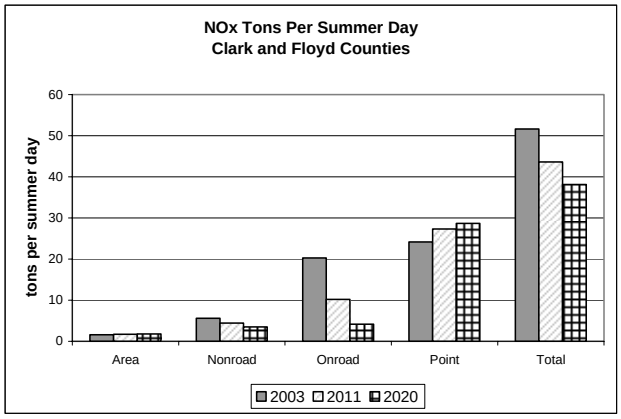
2020

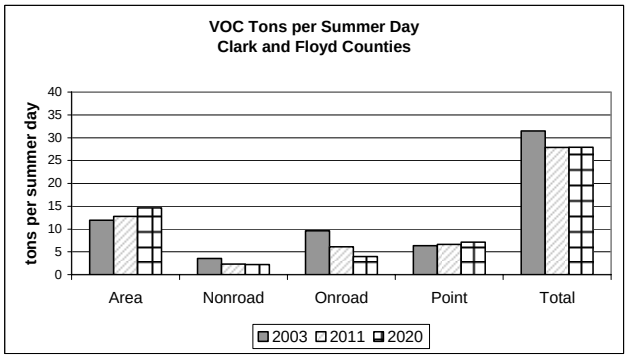
COUNTY_NAM	Category	NOx	VOC
Clark County	Area	0.98	8.53
	Nonroad	2.33	1.30
	Onroad	2.54	2.35
	Point	8.62	5.92
Floyd County	Area	0.82	6.06
	Nonroad	1.16	0.90
	Onroad	1.61	1.63
	Point*	20.04	1.22
TOTAL		**38.10**	**27.91**

Rate of Change	**Clark and Floyd**			
Table 4.1				
	2003	**2020**	**Change**	**%change**
NOX	51.64	38.10	**-13.5**	**-26.2**
VOC	31.47	27.91	**-3.6**	**-11.3**

Rate of Change	**Entire Nonattainment Area**			
Table 4.1				
	2003	**2020**	**Change**	**%change**
NOX	238.65	126.25	**-112.4**	**-47.1**
VOC	135.32	110.97	**-24.4**	**-18.0**

TOTALS-Clark and Floyd Only			
Sector	**NOX2003**	**NOX2011**	**NOX2020**
Area	1.60	1.71	1.80
Nonroad	5.63	4.43	3.49
Onroad	20.27	10.20	4.15
Point	24.14	27.29	28.66
Total	51.64	43.63	38.10
Sector	**VOC 2003**	**VOC 2011**	**VOC 2020**
Area	11.94	12.77	14.59
Nonroad	3.55	2.35	2.20
Onroad	9.60	6.12	3.98
Point	6.38	6.61	7.14
Total	31.47	27.85	27.91





ENTIRE NONATTAINMENT AREA
KY Data

WORKSHEET for Entire Nonattainement Area - IN and KY

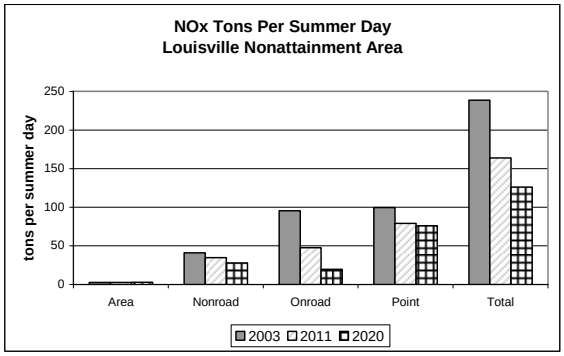
2003	VOC Entire Nonattainment Area			
VOC	**Area**	**NR**	**On Road**	**Point**
Clark	6.98	2.07	5.70	5.53
Floyd	4.96	1.48	3.90	0.85
Jefferson, KY	17.33	14.31	25.34	23.63
Bullitt, KY	3.34	1.77	3.74	8.10
Oldham, KY	2.46	1.54	2.29	0.00
TOTAL	35.07	21.17	40.97	38.11
2003 NOX	**Area**	**NR**	**On Road**	**Point**
Clark	0.87	3.46	12.30	7.01
Floyd	0.73	2.17	7.97	17.13
Jefferson, KY	0.75	31.94	63.29	74.78
Bullitt, KY	0.11	1.81	7.52	0.60
Oldham, KY	0.07	1.63	4.43	0.07
TOTAL	2.54	41.00	95.51	99.59

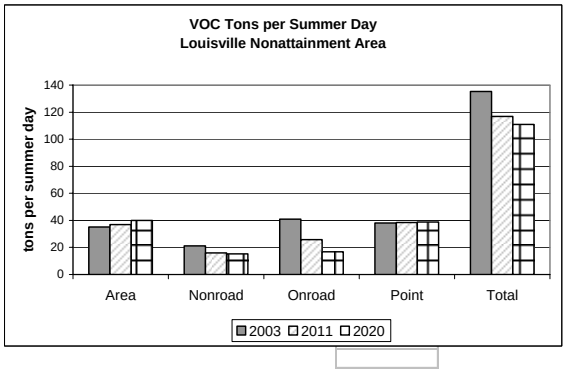
2011	VOC Entire Nonattainment Area			
VOC	**Area**	**NR**	**On Road**	**Point**
Clark	7.38	1.47	3.60	5.64
Floyd	5.39	0.88	2.52	0.97
Jefferson, KY	17.59	10.62	15.49	23.11
Bullitt, KY	3.75	1.82	2.52	8.58
Oldham, KY	2.82	1.08	1.56	0.00
TOTAL	36.93	15.87	25.69	38.30
2011 Nox	**Area**	**NR**	**On Road**	**Point**
Clark	0.93	2.83	6.16	7.25
Floyd	0.78	1.60	4.04	20.04
Jefferson, KY	0.76	27.37	29.62	50.91
Bullitt, KY	0.12	1.60	4.83	0.65
Oldham, KY	0.07	1.37	2.88	0.08
TOTAL	2.66	34.77	47.53	78.93

2020	VOC Entire Nonattainment Area			
VOC	**Area**	**NR**	**On Road**	**Point**
Clark	8.53	1.30	2.35	5.92
Floyd	6.06	0.90	1.63	1.22
Jefferson, KY	17.85	10.64	9.52	22.51
Bullitt, KY	4.26	1.35	2.05	9.16
Oldham, KY	3.32	1.07	1.34	0.00
TOTAL	40.01	15.26	16.89	38.81
2020 Nox	**Area**	**NR**	**On Road**	**Point**
Clark	0.98	2.33	2.54	8.62
Floyd	0.82	1.16	1.61	20.04
Jefferson, KY	0.76	22.17	11.02	46.49
Bullitt, KY	0.14	1.27	2.73	0.72
Oldham, KY	0.09	0.95	1.72	0.08
TOTAL	2.80	27.88	19.62	75.95

SOURCE DATA
Entire Nonattainment Area

Sector	**NOX 2003**	**NOX 2011**	**NOX 2020**
Area	2.54	2.66	2.80
Non-road	41.00	34.77	27.88
On road	95.51	47.53	19.62
Point	99.59	78.93	75.95
Total	238.65	163.89	126.25
Sector	**VOC 2003**	**VOC 2011**	**VOC 2020**
Area	35.07	36.93	40.01
Non-road	21.17	15.87	15.26
On road	40.97	25.69	16.89
Point	38.11	38.30	38.81
Total	135.32	116.80	110.97





KIPDA Budget Summary

Regional (5-County) Emission Estimates			
(See Notes and Conclusions Below)			
	VOCs (kg/day)	VOCs (tons/day)	NOx (kg/day)	NOx (tons/day)
2003 Emission Estimates				
(1) "Normal" using APCD/KIPDA and KYDAQ/KYTC procedures	37170	40.97	86651	95.51
(2) "Normal" using only APCD/KIPDA procedures	36596	40.34	87696	96.67
2030 Emission Estimates				
(1) "Normal" using APCD/KIPDA and KYDAQ/KYTC procedures	15298	16.86	15422	17.00
(2) "Normal" using only APCD/KIPDA procedures	14386	15.86	14306	15.77
(3) "NoBuild" -- Approach 1 using modified APCD/KIPDA procedures	14683	16.18	14395	15.87
(4) "NoBuild" -- Approach 2 using modified APCD/KIPDA procedures	14971	16.50	14707	16.21
2035 Emission Estimates				
(1) Non-Model Approach -- Estimated by KIPDA	18904	20.84	24296	26.78
based on conformity data from 2005 Transportation Plan Update				

Notes: (a) "Normal" means using the ordinary methodology for the procedure listed.

APCD/KIPDA means using the KIPDA travel model for VMT and speeds and the APCD (speed bin, county of origin) approach for emission factors.
This procedure is always used for Clark (IN), Floyd (IN), and Jefferson (KY) counties. This procedure is used for Bullitt and Oldham counties when only APCD/KIPDA procedures were used and for the "NoBuild" approaches.

KYDAQ/KYTC means using KYTC estimates for VMT and speeds and the KYDAQ approach for emission factors.
This procedure is used for Bullitt and Oldham counties when both APCD/KIPDA and KYDAQ/KYTC procedures were used and for the data used for the Non-Model Approach (2035).

(b) "No-Build" means using the "Normal" APCD/KIPDA procedure except the 2003 highway network and 2003 transit trip table (approach 1 only) are used.

(c) Non-Model Approach means using regression with data for 2002, 2009, 2012, 2020, and 2030 from the data developed during the conformity analysis for the 2005 Transportation Plan Update. That data was developed using the "Normal" approach with both APCD/KIPDA procedures and KYDAQ/KYTC procedures.

Mobile Budget Summary

2020 Budget

	KIPDA/DAQ		KIPDA Only		Growth From	
	2020 Build	2030 Build	2030 Build	2030 No-Build	**No-Build**	**2035 KIPDA**
VOC	16.89	16.86	15.86	16.50	4.1%	20.84
NOx	19.62	17.00	15.77	16.21	2.8%	26.78
% Change from 2020 Build		-0.14%				23.39%
		-13.34%				36.52%

DAQ + 2035 KIPDA Plus 10%	Safety Margin	% of Gap Used	% Over 2020 Build
22.92	6.03	24.8%	35.7%
29.46	9.84	8.8%	50.2%